

**EFFECTS OF A HUMAN AGENT AND THE APPLICATION OF  
THE MODALITY PRINCIPLE ON THE LEARNING OF  
CHINESE IDIOMS AND THE ATTITUDES AMONG STUDENTS  
WITH DIFFERENT LEVELS OF INTELLIGENCE**

**by**

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# **EFFECTS OF A HUMAN AGENT AND THE APPLICATION OF THE MODALITY PRINCIPLE ON THE LEARNING OF CHINESE IDIOMS AND THE ATTITUDES AMONG STUDENTS WITH DIFFERENT LEVELS OF INTELLIGENCE**

## **ABSTRACT**

The purpose of this research was to investigate the impact of a Human Agent (HA)'s visual presence and the modality effect in a Computer-based learning (CBL) environment on the learning of Chinese idioms and the attitudes among primary students in Malaysia with different Intelligent Quotient (IQ) levels.

Three modes of multimedia courseware [a Human Agent and Narration mode (HANGC), Narration mode (NGC), and On-Screen Text mode (TGC)] were systematically designed and developed by the researcher using Macromedia Authorware and Macromedia Flash MX. The Instructional Systems Design Model of Alessi & Trollip (2001) was considered in the development of the courseware. A '3×2' quasi-experimental design was adopted in this research using the three modes of courseware as the independent variables and the two level of Intelligent Quotient (IQ) [High Intelligent (HI) and Low Intelligent (LI)] as the moderator variables. The dependent variables were the posttest scores and the attitude scores. The sample consisted of 138 primary three students from two Chinese primary schools in Penang, Malaysia. They were randomly assigned to one of the modes and followed the treatment for 45 minutes. Descriptive and inferential statistics were conducted to analyze the collected data. *t*-test and ANCOVA procedures were used to determine the significant differences of the post scores and attitude scores among the three

groups (HANGC, NGC, and TGC).

The findings of this study showed that students using the HANGC mode had achieved significantly higher post score (PS) than students using the NGC mode; students using the NGC mode had achieved significantly higher post score (PS) than students using the TGC mode; the higher IQ students had achieved significantly higher post score (PS) than lower IQ students; low IQ students using the HANGC mode had achieved significantly higher post score (PS) than low IQ students using the NGC mode. However, the low IQ students using the NGC mode did not achieve significantly higher post score (PS) than the low IQ students using the TGC mode. Furthermore, analysis showed no significant differences among the three groups' attitude scores.

This research revealed that a computer-based human agent and the modality principle had a significantly positive effect on students' learning of Chinese idioms. Emphatically, the human agent could significantly promote low IQ students' learning of Chinese idioms. Overall, there was neither strong preference nor dislikes towards the three modes of courseware.

# **KESAN AGEN MANUSIA DAN PENGAPLIKASIAN PRINSIP MODALITI TERHADAP PEMBELAJARAN IDIOM CINA DAN SIKAP DALAM KALANGAN PELAJAR PELBAGAI TAHAP KECERDASAN**

## **ABSTRAK**

Tujuan kajian ini adalah untuk menyiasat impak kehadiran visual agen manusia (HA) dan kesan modaliti dalam suasana pembelajaran berasaskan komputer (CBL) terhadap pembelajaran idiom Cina dan sikap dalam kalangan pelajar pelbagai tahap kecerdasan.

Tiga mod koswer multimedia [mod Agen Manusia dan Naratif (HANGC), mod Naratif (NGC), dan mod Teks On-Screen (TGC)] direkabentuk dengan sistematik dan dibangunkan oleh penyelidik dengan menggunakan *Macromedia Authorware* dan *Macromedia Flash MX*. Model Reka Bentuk Instruksi Bersistem oleh Alessi & Trollip (2001) telah diambil kira di dalam perkembangan koswer tersebut. Suatu rekabentuk quasi-experimen berukuran '3×2' telah digunakan dalam penyeldikan ini dengan menggunakan ketiga-tiga bentuk koswer sebagai pembolehubah bebas dan dua tahap kecerdasan [Kecerdasan Tinggi (HI) dan Kecerdasan Rendah (LI)] sebagai pembolehubah moderator. Pembolehubah bersandar merupakan skor pasca dan skor sikap. Sampel-sampel terdiri daripada 138 orang pelajar Tahun Tiga daripada dua buah Sekolah Rendah Jenis Kebangsann Cina di Pulau Pinang, Malaysia. Mereka diberi satu daripada tiga mod koswer secara rawak dan diikuti dengan 45 minit rawatan. Statistik deskriptif dan inferens dijalankan untuk menganalisis data yang didapati. Ujian-t dan prosedur ANCOVA digunakan untuk mengesan sama ada

terdapat perbezaan yang signifikan diantara ketiga-tiga kumpulan olahan (HANGC, NGC, and TGC)

Dapatan daripada penyelidikan ini menunjukkan bahawa pelajar yang menggunakan mod HANGC mencapai skor pasca yang lebih tinggi secara signifikan daripada pelajar yang menggunakan mod NGC; manakala pelajar yang menggunakan mod NGC pula mencapai skor pasca yang lebih tinggi secara signifikan daripada yang menggunakan mod TGC; pelajar yang mempunyai kecerdasan (IQ) yang lebih tinggi mencapai skor pasca yang lebih tinggi secara signifikan daripada yang mempunyai kecerdasan (IQ) rendah; pelaja berkecerdasan (IQ) rendah yang menggunakan mod HANGC mencapai skor pasca yang lebih tinggi secara signifikan daripada pelajar yang menggunakan mod NGC. Walau bagaimanapun, pelajar kecerdasan (IQ) rendah yang menggunakan mod NGC tidak mencapai skor pasca yang lebih tinggi secara signifikan daripada pelajar kecerdasan (IQ) rendah yang menggunakan mod TGC. Lebih-lebih lagi, analisis tidak menunjukkan perbezaan yang signifikan diantara ketiga-tiga kumpulan terhadap skor sikap pelajar.

Penyelidikan ini telah mendedahkan bahawa agen manusia berasaskan komputer dan prinsip modaliti mempunyai kesan positif yang ketara ke atas pembelajaran idiom Cina oleh pelajar. Seterusnya, agen manusia dapat menggalakkan pembelajaran idiom Cina dalam kalangan pelajar kecerdasan (IQ) rendah. Pada keseluruhan, tidak terdapat perasaan kesukaan atau ketidaksukaan yang mantap terhadap ketiga-tiga mode koswer.

# CHAPTER 1

## INTRODUCTION

### 1.1 BACKGROUND

Chinese idioms have been and are still the core aspect of Chinese language today. By applying the idioms in writing or conversation, students can advance to a higher cognitive level in Chinese language proficiency (Xiuping, *et al.*, 2003). Luk (1983) also indicated that the teaching of Chinese language placed emphasis on Chinese idioms, which due to several reasons: Firstly, the absence of idioms in compositions was easy to be identified, they could shorten long passages and make otherwise clumsy construction of passages concise and then induce a vivid and distinct effect on readers (Lee & Tse, 1994; Tin, 1989). Secondly, idioms derived from allusions, poetry and proverbs have the cultural identity amongst Chinese people and create a sense of continuity to their history (Luk & Ng, 1998). Furthermore, in recent years, with the economic and cultural exchanges between China and the outside world, more and more foreigners are interested in learning Chinese language. In that sense, Chinese idioms can provide learners who learn Chinese idioms as a second language (L2 learners) with a chance to become acquainted with the essence of the Chinese language (He, 2000).

Chinese idioms are however, difficult to learn even for learners who learn Chinese language as their mother tongue (L1 learners). There are several reasons; the first is the internal reason - the characteristics of idioms such as regular construction, complex contents, and profound meanings make idioms difficult to learn. Secondly,

for centuries, teachers use text as the major format for teaching Chinese idioms material and books as the major teaching tool. As a result, most students feel that the learning process based on this traditional teaching method is boring and they could not understand idioms deeply and apply idioms correctly (Goodfellow, 1994).

The researcher conducted a preliminary survey on the teaching of Chinese idioms among Chinese primary school teachers in Malaysia. From the survey (Appendix E), it was found that 86.3% of the 36 teachers from 14 Chinese primary schools in Malaysia still used traditional method to teach Chinese idioms. More than 90% of the 36 teachers stated that there was not enough time for them to teach each idiom deeply and explain the background of every idiom in details. In order to help primary L2 learners in Malaysia to learn Chinese idioms, the researcher investigated the influence of computer-based learning (CBL) on Chinese idioms learning.

Luk and Ng (1998) did a research on computer assisted Chinese idioms learning in Hong Kong. According to their survey, primary school teachers believed that computers could assist students in learning Chinese idioms more effectively than an idiom dictionary. They designed an experimental program for students between 9 and 11 years old to learn idioms, and showed that L2 learners learned idioms better through CBL environment. However, their program still has several weaknesses as follows: Firstly, according to Fleet (2006), one aspect of language which should not be left untreated is the non-verbal component such as gestures and facial expressions.



These were believed to affect “the intercultural communication process” (Cruz, *et al.*, 1995, pp.3). Shumin (1997) stated that “Ignorance of the nonverbal message often leads to misunderstanding”. Peck (1998) also stated that “learning the gestures which are culturally acceptable in the target language adds to the authenticity of the language experience and can make the language elements more interesting and meaningful to students”. Secondly, Chinese idioms which come from allusions, proverbs, and poetry have cultural, literary, moral and social connotations. They display a panorama of ancient China and offer much knowledge concerning Chinese history (Luk & Ng, 1998). Yiming (2006) indicated that teachers’ integrating the background or stories of idioms into their teaching process can improve students’ understanding and application of the idioms. However, in Luk and Ng’s program, all the stories of idioms were presented in On-screen text version which is too long and too boring for children to read.

In this respect, the role of an emerging tool, namely the pedagogical agent (PA) offers a feasible and enticing approach to integrate the background or stories of idioms with the non-verbal components into the instructional design. According to Clark & Mayer (2003), PAs are onscreen characters who help guide the learning process during an e-learning lesson. Agents can be presented visually as cartoon-like characters, as talking-head video, or as virtual reality avatars. In order to use real gesture and facial expressions in aiding the learning of idioms, the PA would be presented by a human agent (HA) in this study.

Currently, there were a number of studies which were done in order to investigate the effect of an agent's presence in CBL environment. For example, Atkinson (2002) compared the effect of voice-plus-agent, voice-only and test-only instructions in an environment involving multi-step proportion word problems, indicated that Instruction coupled with the visual presence of animated pedagogical agents, more effective at promoting learning than voice-only instruction without agents. He also indicated that examples containing aural instructional explanations more effective at promoting learning than examples with textual explanations (modality effect). According to Mayer (2001), the modality principle suggests that students who learn with narration will benefit more from the increased working memory and more likely to remember and to use the instructional content of the lesson than students who learn in a comparable environment but with on-screen text. Dunsworth and Atkinson (2007) explored three effect (including the modality effect) of an agent's presence in CBL environment in order to foster multimedia learning of science. However, they found that students using voice-only instruction did not perform better than students using the on-screen text (text-only) instruction, that is, there was not an effect of the modality principle.

However, most of the researchers examined the effect of an animated pedagogical agent in the learning of science; few researchers evaluated the effect of a human agent. The researcher is interested in investigating an impact of a human agent's visual presence and an effect of modality principle for the purpose of aiding the

learning of Chinese idioms.

## **1.2 PROBLEM STATEMENT**

From the teaching experiences of the researcher among primary students in China, she found that children could not understand the Chinese idioms in depth and apply them correctly during their examinations and in their daily lives. There are several reasons pertaining to this issue, among them are stated as follows (Xinfang, 2005):

- A. The teaching of Chinese idioms is just a formality. Teachers teach the Chinese idioms perfunctorily in order to fulfill their job requirement.
- B. Teaching of Chinese idioms faces the restriction which comes from the examination system. There is not enough time for teachers to teach children every Chinese idiom in details.
- C. Many teachers still use traditional teaching method which is boring and unmotivated for children to learn.
- D. Misuse of idioms in the society has a negative effect among children.

According to Goodfellow (1994), one important principle in the design of computer assisted vocabulary learning for L2 learners is to address the learners' need. A questionnaire was used in his study. The questionnaire was administered to two target groups: students (from Primary 4 to Secondary 2) and their teachers. In total, there are 69 students and 37 teachers completed the questionnaire.

From the questionnaire, 50% of the primary students were not interested in learning idioms and 60% of them thought that they could understand the idioms but they admitted making occasional mistakes. Most of the secondary students (80%) were interested in learning idioms but they still admitted to making frequent mistakes in applying them. From the teachers' point of view, most students (60-70%) could not understand and apply idioms correctly.

According to Luk and Ng (1998), they stated that Hong Kong primary school students were using the Chinese idioms both incorrectly and inappropriately.

Based on the statement above, the researcher suspected that it should be a real problem for students, especially for primary school students to understand Chinese idioms in depth. Subsequently, a preliminary survey (Appendix E) on the teaching of Chinese idioms was designed for the teachers of Chinese primary schools in Malaysia. Two Chinese language experts helped design and distribute the questionnaires. From 36 responses received, teachers from 14 Chinese primary schools indicated that an average of 49.03% students could understand and apply idioms correctly. 97.2% of the teachers suggested that children could learn better if they know the background or story behind each idiom. However, more than 90% of teachers expressed that they did not have sufficient time to explain the background of each idiom in details. The responses from this preliminary survey indicated that the learning of Chinese idioms was also a problem area for primary students in Malaysia

in Chinese language learning process.

Along with the development of CBL, the learning and attitude problems on the learning of Chinese idioms for primary students can be coped with the aid of HA incorporated into the courseware. The HA integrated into the program is hoped to promote the learning of Chinese idioms.

### **1.3 PURPOSE OF THE STUDY**

There are two purposes in this study. The first purpose is to design and develop three modes of courseware: HA+narration+graphics+captions (HANGC), narration+graphics+captions (NGC) and on-screen text+graphics+captions (TGC). The second purpose is to evaluate the impact of a human agent's visual presence, and to examine the effect of modality principle on the performance and attitudes in relation to Chinese idioms learning among students with different levels of intelligent quotient (High intelligent quotient and low intelligent quotient).

### **1.4 RESEARCH QUESTIONS**

This study will attempt to answer the following questions with respect to children's learning of Chinese idioms:

1. Will students using the HA+Narration+Graphics+Captions (HANGC) mode attain significantly higher post scores (PS) than students using the Narration+Graphics+Captions (NGC) mode?

2. Will students using the Narration+Graphics+Captions (NGC) mode attain significantly higher post scores (PS) than students using the On-screen text+Graphics+Captions (TGC) mode?
3. Will students with high intelligent quotient (HI) and low intelligent quotient (LI) have different post scores (PS)?
4. Will students with low intelligent quotient (LI) attain significantly higher post scores (PS) using the HA+Narration+Graphics+Captions (HANGC) mode than LI students using the Narration+Graphics+Captions (NGC) mode?
5. Will students with low intelligent quotient (LI) attain significantly higher post scores (PS) using the Narration+Graphics+Captions (NGC) mode than LI students using the On-screen text+Graphics+Captions (TGC) mode?
6. Will students using the HA+Narration+Graphics+Captions (HANGC) mode attain significantly higher attitude scores (AS) than students using the Narration+Graphics+Captions (NGC) mode?
7. Will students using the Narration+Graphics+Captions (NGC) mode attain significantly higher Attitude scores (AS) than students using the On-screen text +Graphics+Captions (TGC) mode?

## **1.5 RESEARCH HYPOTHESES**

Based on the above questions, the following seven hypotheses were developed:

H1. Students using the HA+Narration+Graphics+Captions (HANGC) mode will attain significantly higher post scores (PS) than students using the Narration+Graphics+Captions (NGC) mode, that is,

$$PS_{HANGC} > PS_{NGC}$$

H2. Students using the Narration+Graphics+Captions (NGC) mode will attain significantly higher post scores (PS) than students using the On-screen text +Graphics+Captions (TGC) mode, that is,

$$PS_{NGC} > PS_{TGC}$$

H3. Students with high intelligent quotient (HI) will attain significantly higher post scores (PS) than students with low intelligent quotient (LI), that is,

$$PS_{HI} > PS_{LI}$$

H4. Students with low intelligent quotient (LI) using the HA+Narration+Graphics+Captions (HANGC) mode will attain significantly higher post scores (PS) than LI students using the Narration+Graphics+Captions (NGC) mode, that is,

$$PS_{LI-HANGC} > PS_{LI-NGC}$$

H5. Students with low intelligent quotient (LI) using the Narration + Graphics+Captions (NGC) mode will attain significantly higher post scores (PS) than LI students using the On-screen text+Graphics+Captions (TGC) mode, that is,

$$PS_{LI-NGC} > PS_{LI-TGC}$$

H6. Students using the HA+Narration+Graphics+Captions (HANGC) mode will attain significantly higher attitude scores (AS) than students using the Narration+Graphics+Captions (NGC) mode, that is,

$$AS_{HANGC} > AS_{NGC}$$

H7. Students using the Narration+Graphics+Captions (NGC) mode will attain significantly higher attitude scores (AS) than students using the On-screen text+Graphics+Captions (TGC) mode, that is,

$$AS_{NGC} > AS_{TGC}$$

## **1.6 SIGNIFICANCE OF THE STUDY**

The significance of this study can be focused on both the theoretical and practical perspectives. From the theoretical perspective, this study intends to investigate the impact of a human agent's visual presence, and to investigate an effect of modality principle. From the practical perspective, the researcher hopes that the findings from this study can encourage Chinese idioms instructional designers to integrate human agent (HA) into their programs. It is also hoped that this study can help L2 learners (learners who learn Chinese language as their second language), especially L2 learners with low intelligent quotient in Malaysia to learn Chinese idioms better.

## **1.7 THEORETICAL FRAMEWORK**

The theories and models underlying this study were stated as follows which were described briefly in Chapter 2:



- A. Piaget’s cognitive stage (Piaget, 1952, 1951)
- B. The Information Processing Model (Gagne, 1977)
- C. Cognitive Theory of Multimedia Learning (Mayer, 2001)
- D. Social Agency Theory (Mayer, *et al.*, 2003; Moreno, *et al.*, 2001)

### 1.7.1 Piaget’s Stages of Cognitive Development

Piaget’s account of the processes, experiences, and structures involved in cognition describes how people come to know about the world. From his observations of children, Piaget formulated four stages of cognitive development (Table 1.1) that reflect the dominant schemes of thinking children use and the ages at which they use them to organize and interact with their environment (McCown, *et al.*, 1998).

**Table 1.1 Summary of Piaget’s Stages of Cognitive Development (McCown, *et al.*, 1998. pp. 35)**

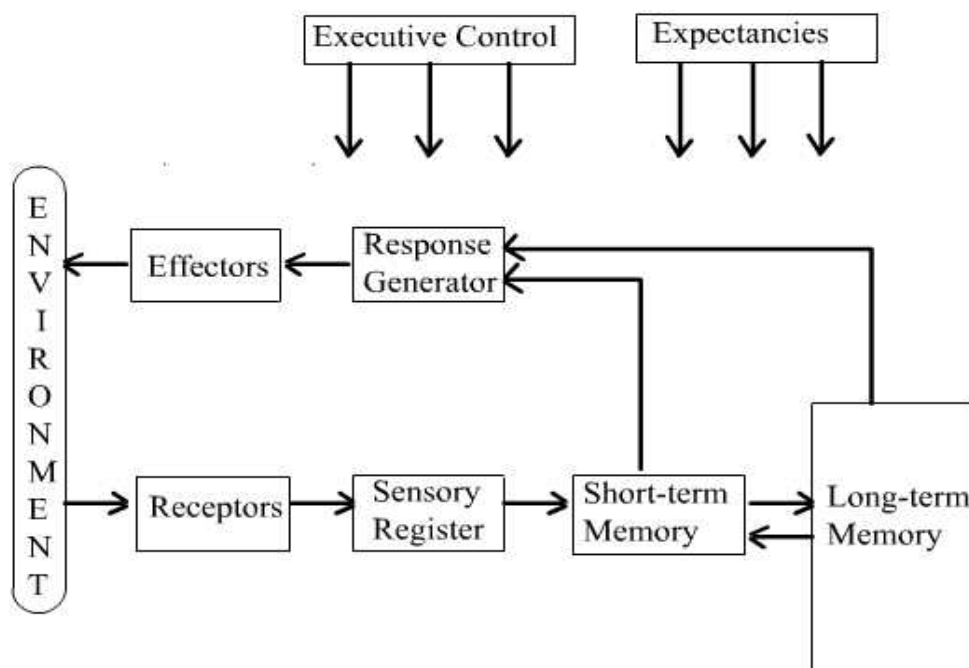
Stages	Approximate Ages	Nature of Schemata
Sensorimotor	0-2	Sensations and motor actions
Preoperations	2-7	Illogical operations; symbolic representations; egocentric; self-centered
Concrete operations	7-11	Logical, reversible operations, decentered; object - bound
Formal operations	11-Adult	Abstract – not bound to concrete objects

Piaget (1952) saw development as a process of successive, qualitative changes in children’s thinking. The changes that children undergo at each stage derive logically

and inevitably from the cognitive structures of preceding stages. The subjects in this study around 9-10 years old are students at the concrete operational stage. According to Piaget, concrete operations is the first stage of operational or logical thought in which schemes become organized into operations that can be used to reason about the world, but children's ability to reason is based on concrete objects.

### 1.7.2 The Information Processing Model

Gagne, et al. (1992) stated that the information-processing model of learning and memory was of great significance for the planning and design of instructions. A version of this model is shown in Figure 1.1.



**Figure 1.1 Model Employed by Information-processing Theories of Learning and Memory (Gagne, 1974)**

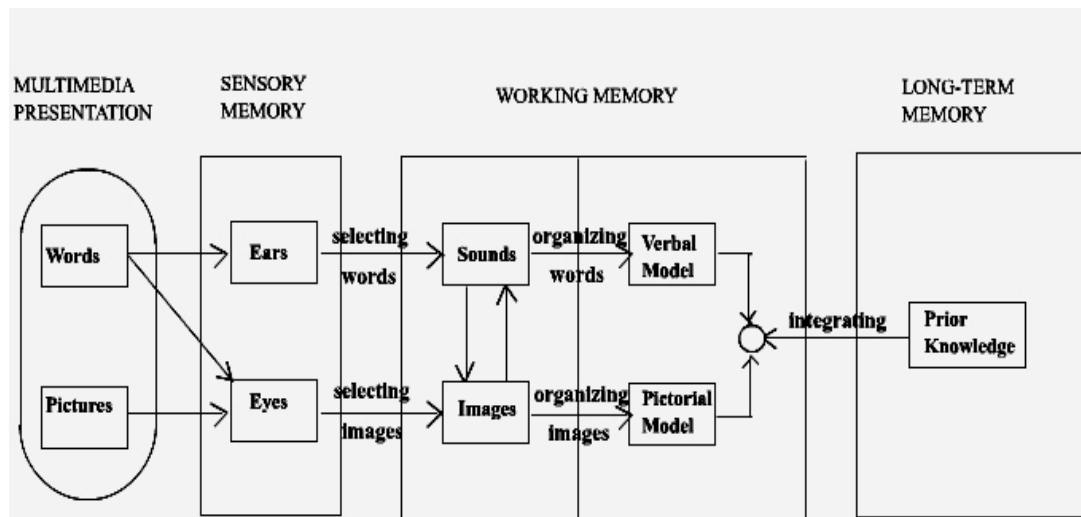
From the environment, the learner receives stimulation which activates his receptors and is transformed to neural information. Initially, this information enters a structure (or structures) called the sensory register, where it persists for a very brief interval. During this short interval, the stimulation may be processed by selective perception into perceived objects and object-qualities, or features. This “information” may next be stored in short-term memory as auditory, articulatory, or visual images for up to twenty seconds, which are subject to rehearsal. In order that information can be remembered for longer periods and in larger quantities, it is semantically encoded to a form that will go into long-term memory. Processes of search may be instituted, followed by the process of retrieval. At this point, the information may be returned to the short-time memory, which is conceived as a “working” or “conscious” memory, and then the information may be passed to a generator and transformed into some kinds of actions. The information from long-term memory may also be directly passed to a response generator and transformed into some sort of action. The message serves to activate effectors which results in a performance that can be observed to occur in the learners’ environment (Fong, 1995; Gagne, 1977).

### **1.7.3 Cognitive Theory of Multimedia Learning**

According to Mayer (2001), multimedia referred to the presentation of material using both words and pictures together rather than words alone. By words, he meant printed text (that is, words printed on the screen that people read) or spoken text (that is, words presented as speech that people listen to through earphones or speakers).

By pictures, he meant static illustrations such as drawings, charts, graphics, maps, or photos, and dynamic graphics such as animation or video (Clark & Mayer, 2003).

Mayer (2001) stated that, the design of multimedia environments should be compatible with how people learn. He presented a cognitive model of multimedia learning which intended to represent the human information processing system (Figure 1.2).



**Figure 1.2 Cognitive Theory of Multimedia Learning**

The boxes represent memory stores, including sensory memory, working memory, and long-term memory. Pictures and words come in from the outside world as a multimedia presentation and enter sensory memory through the eyes and ears (indicated in the Sensory Memory box). Sensory memory allows for pictures and printed text to be held as exact visual images for a very brief time period in a visual sensory memory and for spoken words and other sounds to be held as exact auditory

images for a very brief time period in an auditory memory. The arrow from Pictures to Eyes corresponds to a picture being registered in the eyes; the arrow from Words to Eyes corresponds to printed text being registered in the eyes.

The central work of multimedia learning takes place in the Working Memory. Mayer (2001) advocated that “Working memory is used for temporarily holding and manipulating knowledge in active consciousness.” The visual sensory memory and the auditory memory comes into the Working Memory, that is visual images of pictures and sound images of words as represented in the left side of the box labeled Working Memory in Figure 1.2; The arrow from Sounds to Images represents the mental conversion of a sound (such as the spoken word *cat*) into a visual image (such as an image of *cat*)-that is, when you hear the word *cat*, you might also form a mental image of a *cat*. The arrow from Images to Sounds represents the mental conversion of a visual image into a sound image- that is, when you see a picture of *cat*, you may mentally hear the word *cat*. These processes may occur by mental association in which the spoken word *cat* primes the image of a *cat* and vice versa. In contrast, the right side of the working memory box represents the knowledge constructed in working memory- pictorial and verbal mental models and links between them. The major cognitive processing required for multimedia learning is represented by the arrows labeled Selecting images, Selecting sounds, Organizing images, Organizing words, and Integrating.

The box labeled Long-Term Memory is the learner's storehouse of knowledge. Unlike working memory, long-term memory can hold large amounts of knowledge over long periods of time. For a person to actively think about material in long-term memory, it must be brought into working memory (as indicated by the arrow from Long-Term Memory to Working Memory).

#### **1.7.4 Social Agency Theory**

Social agency theory (Dunsworth & Atkinson, 2007; Atkinson, *et al.*, 2005; Mayer, Sobko & Mautone, 2003; Moreno, *et al.*, 2001) contends that integrating verbal (spoken words) and non-verbal social cues (e.g., gestures, gaze, emotion) into a multimedia environment can simulate the human-to-human connection, therefore facilitating the students' engagement in the learning process. Once such a simulated human-to-human connection is established, the social communication between the student and computer is thought to be natural and automatic, following the rules of human communication. Furthermore, these automatic responses to computers can be evoked by minimal social cues (Reeves & Nass, 1996). A gesture, gaze, or nod from a pedagogical agent can create the nonverbal forms of human-to-human communication which can promote a learner's motivation toward the task and his or her cognitive engagement in it (Atkinson, 2002), thus encouraging the learner to behave as if he or she is communicating with another human.

The major independent variables of the present study were three modes of

courseware: On-screen text (TGC), Narration (NGC), and Narration+HA (HANGC). The dependent variables were the post scores and the attitude scores. The post scores were selected as an indicator of academic performance for all groups participated in the study. The level of preferences of using the three modes was measured using the attitude test. The moderator variables were the different levels of intelligent quotient: high and low.

## **1.8 LIMITATIONS OF THE STUDY**

The first limitation of this study is that students involved in this study were from two Chinese primary schools in the state of Penang and might not be representative for the whole nation of Malaysia or other parts of the world.

The second limitation is that students are exposed to one mode of instruction for only about 45 minutes. It would be more appropriate if the study could be further extended so that students could learn each idiom repeatedly for one more times and their achievement could be measured over a longer period of time.

The third limitation of the study is due to the 10 idioms and the stories which were chosen by the researcher. There are hundreds of idioms, some of which can be understood easily without HA. On the other hand, others are difficult to understand because of their profound meanings. Thus, the results of this study could not be generalized for every Chinese idiom.

Fourthly, this study is limited by the quality of the multimedia CBL courseware developed by the researcher.

## **1.9 DEFINITIONS**

**Human agent (HA)** – Clark and Mayer (2003) stated that, “Pedagogical agents are onscreen characters who help guide the learning process during an e-learning episode. Agents can be representations of artificial characters using animation and computer-generated voice or real people using video and human voice”. In the context of this study, the agent presented with real people using video and human voice is called as a human agent.

**Modality principle** - Students learn better when words in a multimedia message are presented as spoken text rather than printed text (Mayer, 2001). In this study, it means students learn better when stories of Chinese idioms are presented as spoken text rather than printed text.

**Attitude test** – a test adapted from Moreno’s (1999) agent based software favorableness survey to measure the level of preferences of using an agent-based application.

**Attitude score (AS)** – student’s score in the attitude test



**Performance test** – a test developed to measure the understanding and application of the Chinese idioms.

**Performance (PS)** – Post score in the performance test.

**High Intelligent quotient student (HI)** – students having scores higher than the group mean in the Cattell Culture Fair Intelligence Test (CCFIT).

**Low Intelligent quotient student (LI)** - students having scores lower than the group mean in the Cattell Culture Fair Intelligence Test (CCFIT).

**HA+Narration+Graphics+Captions mode (HANGC):** In the HANGC mode, stories of idioms were presented by the narration of a human agent(HA) with gesture and facial expressions which are synchronized to the Graphics and Captions (GC), see Figure 1.3.

开心成语一十词

返回

Unit 1

狐假虎威

名落孙山

天衣无缝

井底之蛙

亡羊补牢

条目	狐假虎威 hú jiǎ hǔ wēi
出处	《战国策·楚策一》
释义	仗着他人的势力，欺压别人。
近义	仗势欺人， 狗仗人势
反义	无
例句	他靠着老干爹的势力，狐假虎威，无恶不作。

点击按钮听故事

Figure1.3 HA+Narration+Graphics+Captions mode (HANGC)

**Narration+Graphics+Captions mode (NGC):** In the NGC mode, stories of idioms were presented by the audio instruction which is synchronized to the Graphics and Captions (GC), see Figure 1.4.

**开心成语十词** 返回

点击铃儿听故事

<b>条目</b>	名落孙山 míng luò sūn shān
<b>出处</b>	《过庭录》
<b>释义</b>	孙山考试考取最后一名, 而“名落孙山”比喻投考学校或参加各种考试, 没有被录取。
<b>近义</b>	榜上无名
<b>反义</b>	金榜题名
<b>例句</b>	每年高考都有很多学生名落孙山。

**Unit 1**

- 狐假虎威
- 名落孙山
- 天衣无缝
- 井底之蛙
- 亡羊补牢

**Figure 1.4 Narration+Graphics+Captions mode (NGC)**

**On-screen text+Graphics+Captions mode (TGC):** In the TGC mode, stories of idioms were presented with all of the instructional content as text, which appeared just to the left of the Graphics and Captions (GC), see Figure 1.5.

**开心成语十词** 返回

**继续**

一口废井里住着一只青蛙。一天,青蛙在井边碰上了一只从东海来的大龟。青蛙就对海龟夸口说:“你看,我住在这里多快乐!有时高兴了,就在井栏边跳跃一阵;疲倦了,就回到井里,在砖洞边睡一会儿。或者只留出头和嘴巴,安安静静地把全身泡在水里;又或者在软绵绵的泥浆里散一会儿步,也很舒适。你再看看那些虾和蝌蚪,他们谁也比不上我!”

**井底之蛙** 

jǐng dǐ zhī wā

**条目** Unit 1

**出处** 狐假虎威

《庄子·秋水》 名落孙山

**释义** 天衣无缝

生活在井底的青蛙,只能见到井底那么大的一块天,比喻阅历狭窄,见识短浅的人。 井底之蛙

**近义** 亡羊补牢

坐井观天,孤陋寡闻

**反义**

见多识广

**例句**

他的见识短浅却不愿学习,只能做个井底之蛙。

**Figure 1.5 On-screen text+Graphics+Captions mode (TGC)**

## **1.10 SUMMARY**

The study compared student's performance and attitudes when they use the three modes of multimedia courseware to learn Chinese idioms. It is expected that the impact of a human agent's visual presence and an effect of modality principle can be found, that is positive attitude and better achievement among students can be found when the instruction is coupled with agent and narration (HANGC), and instruction containing aural explanations more effective at promoting learning than instructions with textual explanations (modality effect). The application of a HA in the teaching-learning of Chinese idioms process has been substantiated by Gagne's (1977) information-processing theories of learning, Mayer's (2001) cognitive theory of multimedia learning, and social agency theory (Mayer, Sobko, & Mautone, 2003; Moreno, *et al.*, 2001).

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1 INTRODUCTION**

This Chapter attempts to provide literature reviews related to the following areas of study: Chinese Idioms Learning among Primary School Students and Computer Assisted Language Learning (CALL); Piaget's Stages of Cognitive Development; Gagne's Theory; Cognitive Theory of Multimedia Learning; Human Agent and Learning; and Intelligence and Language Learning.

#### **2.2 CHINESE IDIOMS LEARNING AMONG PRIMARY SCHOOL STUDENTS AND THE COMPUTER ASSISTED LANGUAGE LEARNING (CALL)**

##### **2.2.1 The Case of Chinese Idioms Teaching and Learning**

In recent years, with the communication between China and the outside world becoming increasingly frequent, more and more foreigners have interest in learning the Chinese language. Chinese idioms which epitomize Chinese history and culture are a treasure of Chinese language (He, 2000). Luk & Ng (1998) stated that "Idioms derived from allusions, poetry, and proverbs have cultural, literary, moral and social connotations that maintain a sense of cultural identity amongst Chinese people and create a sense of continuity to their history". Chinese idioms could offer an insight of ancient China, offer a lot of knowledge concerning Chinese history, and can provide L2 learners (learners who learn Chinese language as their second language) with an opportunity to become acquainted with the essence of the Chinese language.

However, most teachers still use the traditional method (text is the major teaching