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Promoting thinking skills through interactive character learning model (ICLM) – Chinese character learning using WhatsApp for Malay L3 learners

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Abstract

Chinese characters are known as ideographs and this system of writing differs totally with the system of writing of Malay L3 learners' first and second languages. Since each Chinese character depicts a strong association between its sound, shape and meaning, the character writing hence involves a series of mental processes. Owing to this unique feature, Malay L3 learners need to struggle through the process of writing as they need to remember not only the shape of any character, but also its sound and meaning. In this research, we try to use ICLM to facilitate the learning of Chinese characters for Malay L3 learners and hence help them to recognize the Chinese characters more effectively besides making the process of learning more interesting and therefore, analysing its results. Through analysis, we found that Malay L3 learners shown more interest and gave faster responses in sentence making. Their ability in recognizing the correct characters and making sentences also increased following the introduction of ICLM.

Keywords: ICLM, Malay L3 learners, WhatsApp, thinking skills

1. Introduction

In light of the rapid growth in China's economy, and its increasingly important role in the world, Mandarin has therefore become more and more important especially to those people who wish to do business with China. However, the learning of Mandarin has been complicated by its unique way of writing compared to the Romanised system of writings used by other major languages in the world such as English and France. Therefore, in order to master the Mandarin Language, one has to first learn writing Chinese characters as a preparation to enter the world of Chinese.

Through Chinese character learning, we can also get a better access to the roof and foundation of the Chinese culture and civilization (Ouyang, 2009). Hence, Chinese characters are literally the core part of Mandarin language and therefore any study approach of Mandarin which ignores Chinese character learning is considered by Ouyang (2009) to be incorrect. This idea is also supported by Wang (1999) where he agrees that learning Mandarin is mainly to study the Chinese characters.

Owing to the fact that Chinese writing is known as the ideograph which differs from English or other Romanised writing systems, every single Chinese character represents its meaning(s) rather than the sound. Hence to understand Mandarin better is to study its characters. In fact, every Chinese character represents three distinctive elements, namely, the shape, the sound and the meaning. As such, a full script of Chinese writing is actually composed of characters with their distinctive functions and features according to its grammar and syntaxes.

Therefore, in order to truly understand Mandarin, these three elements must be remembered. There is no way to read its sound accurately by merely looking at the character. Thus, we need to memorize the sound together with the shape and also its meaning. This problem is further made difficult to the Malay L3 learners where their first language is Malay language, and their second language is English. Both their first and second language adapt a Romanised

system of writing in which they can recognize the sound of every word. This is totally different from Mandarin Chinese.

We hence introduce the smart phone/tablet to help Malay L3 learners in learning Mandarin particularly in recognizing the characters and also their sounds and meanings. We then formulate an interaction model using a smart phone/ tablet and the internet to facilitate the character learning and also constructing simple sentences for the Malay L3 learners. We aim at setting up a link among the three forms of a character, namely the shape, the sound and also the meaning to assist the Malay L3 learners in memorizing Chinese characters.

Generally, to communicate well and efficiently with the Chinese is to speak their language, to write their language and to use their language. This suits the purpose of Chinese President Xi Jinpin in his key note speech The Real China (2014) at the college of Europe in Bruges.

2. Literature Review

2.1 Association between Pinyin, Sound, Meaning and Mental Process

Chinese characters are known as ideographs which differ greatly from the system of writing used by other major languages in the world, such as English. Its difficulty and complexity are acknowledged by many researchers such as Shen (2005), Wong, Chai & Gao (2011). This complexity and difficulty are due to the three elements in any Chinese character: the shape, the sound and the meaning. This challenge is also rectified by Shen (2004). In order to master the shape of any character, learners need to remember the proper sequence of every stroke to construct the shape, and every stroke has its unique way of writing such as dot (diǎn), horizontal line (héng), vertical line (shù) falling down from right (piě), falling down from left (nà) and others. Then its sound, either upper and lower lip (labial) 唇音, blade of the tongue (laminal) 舌面, various parts of the front of the tongue (coronal) 舌尖前音, alveolar ridge 齐齿, or others, lastly the meanings: the basic meaning and its derived meaning. All these combinations require

learners' imagination and creative thinking (Li, 1989). This process of writing a Chinese character involves processes as suggested by Bloom (1956), namely Knowledge, Understanding, Application, Analysis, Synthesis and Evaluation.

In order to write every stroke in the correct order, learners must have the knowledge of eight basic strokes, and then they have to understand the law of sequence in order to write the character with the correct order of stroke (application), to analyse its components and radicals (偏旁, 部首), then to form the character using correct components (synthesis). Finally, learners need to judge the correctness of the character and also the beauty of each character (Evaluation). Hence, most learners find writing characters as the most difficult skills to master (Ye, 2011).

Wong (2012) argues that to learn Chinese characters learners need to go through six steps in hierarchical order: comprehension, combination, memorizing, application, analysing and creation. He also argues that writing a character which involves using a limited number of semantic components and phonetic components (声旁) is cognitively effective. Wong (2012) has pointed out that the character learning process poses a big challenge to non-native learners.

2.2 Mobile Language Learning via WhatsApp

Laurillard and Sharples (2007) have pointed out mobile devices offer five advantages for education, namely accessibility learning opportunity, connection and personal experience. Therefore, mobile devices have literally provided a simpler approach to learning, especially learning languages. Moreover, mobile learning and laptops (computers, smartphones, iPads, and so on) has enable the interactivity among the learners and also their instructors. Hence, mobile devices provide students with "anytime, anywhere learning" as claimed by Peters (2009). Besides, Kulkulska-Itulme and Shield also argue that mobile-assisted language learning (Mall) provides students with rich, real-time, convenient, social contact, collaborative, contextual learning opportunities, both inside and outside the classroom.

These advantages, coupled with WhatsApp Messenger which was created by Brian Acton and Jan Koum (2009), has made language learning more interesting, interactive and easier. WhatsApp Messenger is a platform for instant text messaging, images, voice-communication, and video communication among learners and instructors. These important features have facilitated the teaching of languages, particularly Mandarin language in view of the aforesaid complexities in Association between Pinyin, Sound, Meaning and Mental Processes.

Since its creation, WhatsApp has proved to be useful in teaching English language all the while. Basma Issa Ahmad Alsaleem (2013) shows that teaching English language in word choice and voice using WhatsApp has brought about significant improvements in the learners. Ana Gimeno (2013) also shows that 90.63% out of 95 students agreed that WhatsApp as an e-learning platform had made them more motivated in learning English. Therefore, using WhatsApp as a platform to teach Mandarin will be as effective as for English, because WhatsApp provides a strong combination between the sound and the shape of a Chinese character. Learners need to key in the correct Pinyin (phonetic system) in order to get a display of a list of homonyms and homophones. All these characters may have the same phonetic sounds or same phonetics sound but different tones, or they may have the same phonetic sounds but is different in meaning or grammar. Next, the learners need to choose from the list the correct character which they intend to use through a series of mental processes. Hence, to choose a correct character may involve a higher mental process as well.

Though English language learners may use the short hands and pidgin words while using WhatsApp (Mohammed Mustapha, 2013), this problem will not happen in Malay L3 Mandarin learners. This is because learners need to key in the correct Pinyin in order to get a list of correct homonyms and homophones. Hence, using WhatsApp in Malay L3 learners will indirectly enhance their command of the phonetics as well. Moreover, the features provided by WhatsApp such as group chats, custom status, and allowing users to send photos and videos and share voice notes have made group discussion among Malay L3 learners and their instructor more agile and full of fun. What is more, WhatsApp is more

economical compared to SMS. In view of the excellency in multi-tasks of WhatsApp, we have made it an important tool in our teaching model, namely the Interactive Character Learning Model (ICLM) (Chu & Toh, 2014) as developed earlier.

3. Methodology

This research uses both qualitative and quantitative methods to analyse the findings. We use qualitative approach for descriptive analysis whereas quantitative approach for analysing attributes in term of frequency that facilitate the study of Chinese character. Students are asked to have either smartphones or tablets which are equipped with WhatsApp for communication purposes. The subjects have been exposed to Chinese Pinyin (Chinese Phonetic system) earlier and have also acquired basic knowledge in Chinese character when they were pursuing Mandarin Level I (TMC 401) and II (TMC 451). Two different tasks will be given to the students in the 6th and the 10th week of the semester. The raw data will be collected using one of the applications on WhatsApp which provides the option to send all the assignments in the chat history into a .txt file, attached to an email.

Fifty-seven undergraduate students taking Mandarin Level III (TMC 501) as L3 in UiTM Johor for Mac-Jul 2015 semester with 14 week-lesson (two hours each) participate in this research. By the time they take TMC 501, they are already acquainted with a total of one hundred and five Chinese characters which they have learned from the earlier semesters. This store of Hanzi (Chinese characters) will thus enable them to construct more than hundred phrases, clauses, and sentences. They are able to build sentences with the limited characters which they have mastered earlier. The students are asked to key-in one of the sentences given in their character exercise book in the WhatsApp group including Chinese Pinyin and the Malay equivalence. Students were taught the method of keying-in Chinese Pinyin (Pinyin Joe Macro) and Chinese character using Pinyin input via smartphones or tablets.

This process involves a series of mental processes. First the students need to compartmentalize the given sentence into its separate parts, that is, its individual character. After they have recognized the character, then they will try to literally recall its Pinyin. This process involves knowledge (i.e., the first level of Bloom's Taxonomy). Once they key in the correct pinyin (perhaps after a few attempts), then they need to pick out one correct character from a list of characters displayed. This process involves recognizing the correct form of the character which they are looking for. After they have completed the sentence, they need to send their sentence to the WhatsApp group created earlier.

In short, from the sentence written in the exercise book, to key-in the correct character students need to type in Chinese Pinyin and have to verify the correct pinyin so that they can get the correct word. Next, students have to verify the word by referring to the original text in the workbook and lastly send the sentence to the WhatsApp group. From the keying-in and word finding processes, students are reinforced in Chinese Pinyin and hence build strong connections between the character and its pronunciation.

3.1 Procedure

This research consists of 4 stages.

Stage 1

i. Reviewing Chinese Pinyin

Stage 2

i. Introducing WhatsApp
ii. Create WhatsApp chat-group
iii. Introducing Pinyin system (Pinyin Joe Macro), so that students can display the Pinyin together with the tones for the whole sentence
iv. Explaining the relationship between correct pinyin and its relevant Hanzi
v. Teaching students to use Pinyin Joe Macro system in Microsoft Office words so that the whole Pinyin together with its tone are displayed

Stage 3

A. *Delivering Task 1*

i. Looking at the sample sentences provided in the exercise book <汉字练习簿 3>, page 12.
ii. Judging from the separate character regarding its Pinyin
iii. Checking its Hanzi through the glossary arranged in Pinyin
iv. Verifying the Hanzi, finding its relevant meaning and correct Chinese character
v. Typing it out one by one according to the sequence as it is in the sample sentence
vi. Converting the meaning of the whole sentence into Malay Language (Malay Equivalence)
vii. Sending the sentence in Hanzi together with its Malay equivalence to the chat-group
viii. Time duration given to Task 1 is one week

B. *Delivering Task 2*

i. Sentence constructions using all Hanzi which the students have studied from chapter 1 through 3, coupled with the previous knowledge in level1 and 2.
ii. Judging from the separate character from its pinyin
iii. Checking its Hanzi through the glossary arranged in Pinyin
iv. Verifying the Hanzi, finding its relevant meaning and Chinese character
v. Typing it out one by one according to the sequence as it is in the sample sentence
vi. Converting the meaning of the whole sentence into Malay Language
vii. Sending the sentence in Hanzi together with its Malay equivalence to the chat-group
viii. Time duration given to Task 2 is one week

Stage 4

i. All tasks sent to the chat-group will be viewed by the instructor and also other group members.
ii. The instructor will transcribe the entire task into txt.file once the instructor has received them all.
iii. The txt.file will then be shown by using projector during class session. Evaluation will be given in detail according to the accuracy of meaning and correctness of punctuation.

4. Results and Discussion

4.1 Elaboration of Stages

During Stage 1, the instructor reviews the Pinyin and emphasizes its correct tones as well, since different tones with the same pinyin will produce different Hanzi. Hence, to key-in the correct Hanzi, students not only need to give its correct pinyin but also its correct tones.

Activities in Stage 2 are basically about forming the WhatsApp chat-group and using Pinyin Joe Macro. The instructor will demonstrate using Pinyin Joe Macro to produce Pinyin and Hanzi to the student via projector. Next, all students are asked to join the WhatsApp chat-group created by a group administrator. The class representative will become the group administrator.

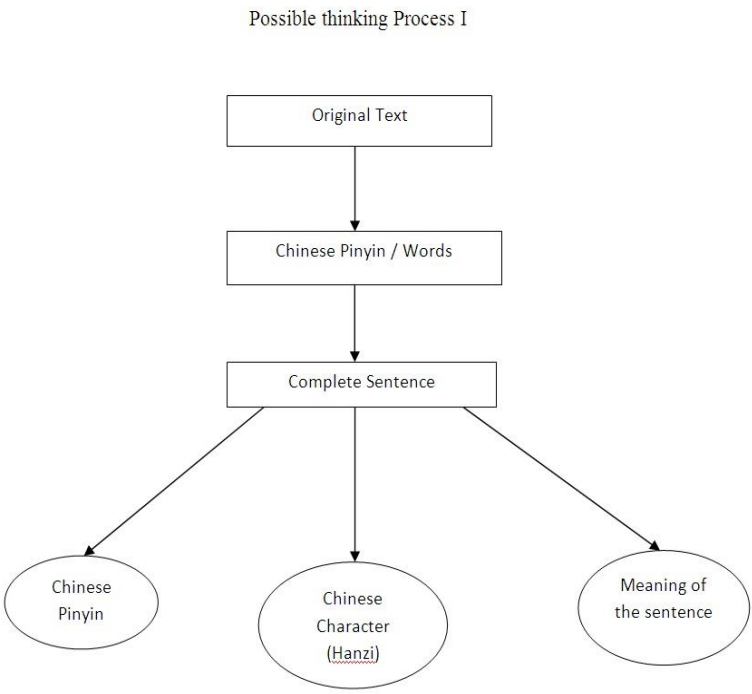


Figure 4.1. Possible thinking process I

After all the procedures have been done, the instructor will start the class activity of typing Pinyin through WhatsApp using simple sentences or short phrases.

Example:

我爱你。（I love you）	谢谢！（Thank you）
Wǒ ài nǐ.	Xièxie!

This session literally involves both minds-on and hands-on activities. The whole session can be viewed as illustrated in Figure 4.1. From Figure 4.1, firstly students refer to the original text as assigned by the instructor. Then, they look for correct pinyin by referring to the glossary or the textbook. After this procedure, they try to type out the whole sample sentence with the respective Chinese Pinyin, Chinese character, and meaning of the sentence in mind.

Stage 3 involves delivering learning tasks to the students. There will be two tasks given, namely Task 1 and Task 2. This stage involves a much more complex thinking process as illustrated in Figure 4.2. The thinking process further explains the procedures involved in both Task 1 and Task 2.

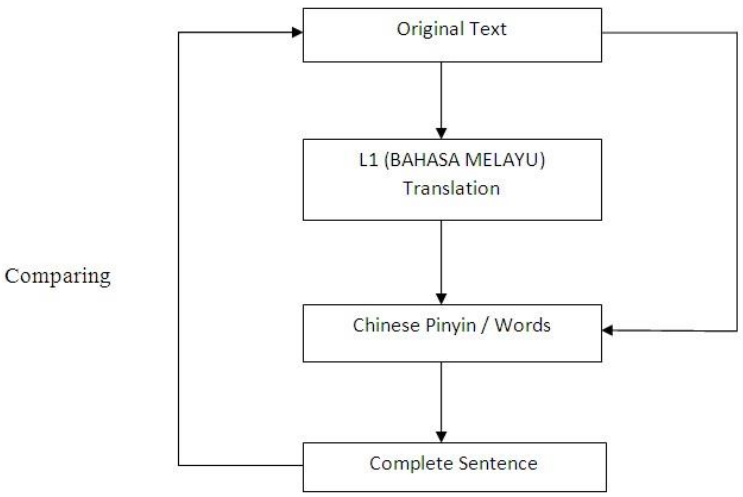


Figure 4.2. Possible thinking process II

Task 1:

i. Referring to sample sentence in the exercise book.
ii. Recalling the correct Pinyin for each Hanzi
iii. Referring to the glossary at the back of the text book for its relevant Hanzi to further verify that this pinyin will produce the exact Hanzi
iv. Keying-in the Pinyin through WhatsApp
v. Typing its equivalence in Malay
vi. Sending the task to the chat-group

Task 2:

i. Sentence constructions using all Hanzi which the students have studied from chapter 1 through 3, coupled with the previous knowledge in level1 and 2.
ii. Students need to construct a complete sentence in Hanzi and ensure that it is correct grammatically and also with correct punctuations.
iii. Once it is completed, students will send their tasks to the WhatsApp chat-group.

Finally, through stage 4 (evaluation), after the instructor has examined Task 1 and 2, a thorough discussion on students' work will be carried out. Comments will be duly given in order to motivate the students to improve their works. The final stage is regarding the evaluation of both Task I and Task II. For easy and clear reference, the whole processes of the two tasks can be simplified as in Figure 4.2. As for the evaluation, we have categorized the criteria as shown in Table 4.1.

We would like to restate here that treatment of L3 learners is vastly from treatment of L1 learners as L3 do not have sufficient language exposure in terms of time, syllabus, contents, and learning environment. Hence, the thinking skills involved in L3 learners will not be the same as L1 learners. To further illustrate, L3 learners do not begin their character learning with strokes and simple characters, which begin only with one, two, or three strokes. Besides, there are no inter-related usages of Mandarin among order subjects as L1 learners do. Therefore, learning characters for L3 learners must take into consideration the strokes, forms, Pinyin, meanings, and sentence constructions together so as to give

them a real learning scenario. This process will later transform into a constructive experience for them to compensate for a lack of exposure to the language.

Table 4.1. Types of errors

Categories	**Sub-categories**	**Task 1**	**Task 2**
Character	wrong choice of character	2	8
	missing character	1	5
	redundant of character	1	2
	wrong use of character due to key-in mistakes	1	2
	errors due to problems of homonym, homophone and homograph	3	22
Punctuations	lack of punctuations	27	14
	inappropriate punctuation	1	1
Grammar	structure	-	4
	translation errors	-	8
	others	-	6
Semantic		-	5
Correctness and completeness of sentences		24	11

There are altogether five major categories, namely Character, Punctuations, Grammar, Semantic, and Correct and Complete sentences. Among these categories, the first 3 categories are further divided into their respective sub-categories. For example, category Character; it is further split down into 5 sub-categories. There are: wrong choice of character (homophone, homograph, and homonym), missing character, redundant of character, wrong use of character due to key-in mistakes. "Wrong choice of characters" refers to errors due to problems of homonym, homophone and homograph.

Example:

Homograph — mǎi 买 (buy), mài 卖 (sell) — Same Romanised spelling but different tones will bring out different character with different meanings.

Homophone zuò 作 (to do) } Same Romanised spelling with same tone can also refer to different Hanzi.
zuò 座 (sit) }

And wrong use of character refer to the mistakes done when students key-in the Romanised spelling wrongly and finally the different characters are used.

Example:

tiān 天 , key-in as tí ēn 题 嗯

As for punctuations, it is further divided into two sub-categories: Lack of punctuation and inappropriate punctuation. Lastly, category Grammar is divided into 3 sub-categories, which are structure, translation error, and others.

Now, we analyse both tasks according to these categories. We will discuss our findings for Task I and Task II separately.

First, we look at Task I. After we collected all the data for Task I and analysed them, we found that for the category character, two out of fifty-seven students (2/57) students made mistakes in wrong choice of character and eight out of fifty-seven students (8/57) of the students used a redundant character. However, only one out of fifty-seven students (1/57) made a mistake in missing character, while three out of fifty-seven students (3/57) made mistakes due to homographs. And for category Punctuation, there are twenty-seven out of fifty-seven (27/57) students who totally left out the punctuations while one out of fifty-seven student used inappropriate punctuation. As Task I only involved typing sentences referring to the text given in the book, no students made any mistakes in the grammar, spelling, translation, and semantic categories.

The real challenge comes from Task II where students need to construct their own sentences based on the character (Hanzi) that they have learned from chapter 1 to chapter 3. First, we look at character. No students made mistakes in wrong choice of character. However, three out of fifty-seven students were involved in the category of missing character.

Example:

下午 **刘 半** 王 明达 去 健身 中心 做 云动。

Explanation: i. 刘 liú (homograph)
六 liù
ii. Missing character '点 diǎn'

Besides, two out of fifty-seven students used redundant characters.

Example:

i. 早上七点半一把点半, 王明达开车去上班, 收费站**派**长龙**呢**和很**赛**车。

Pài Redundant sāi

ii. 下午五点**版**王明达 回家**开车回[。]** missing punctuation

Homograph 版 Bǎn Redundant

半 Bàn

For wrong use of character, there are four out of fifty-seven students involved in this sub-category.

Example:

妈妈 跟 爸爸 **去 过 八十回**_老家 了。

*坐巴士回老家了

Lastly, we noticed that this sub-category poses the most problems to the students. We found that nineteen out of fifty-seven students made mistakes due to homographs.

Example：

从 吉隆坡 到你的老家多**元**?

X 元 yuān

√ 远 yuǎn

今天 早上 **刘** 点, 王 明达 去 健身 中心 做 运动。

X 刘 liú

√ 六 liù

在早上六**电**半 , 王明达起床给去上班。

X 电 diàn

√ 点 diǎn

开车 的 时候 要小心, 不要 超速 和 **创**红灯**[。]**

X 创 chuàng

√ 闯 chuǎng

妈妈 跟 爸爸 去 果园 **才** 水果 了。

X 才 cái

√ 采 cǎi

For punctuation, thirteen out of fifty-seven students did not use any punctuations in their sentences and one out of fifty-seven used a coma to end the sentence. And one out of fifty-seven did use a full stop to end the sentence. However, the student use "." Instead of Chinese way of writing a full stop " 。" Example:

买了衣服以后**[,]**我们去打保龄球**[。]**

Besides homograph that poses the most problems to the students, we found that grammar part is also one of the major obstacles to the students in writing sentences. There are five out of fifty-seven who made structural mistakes. Basically, this problem is due to the mother-tongue negative transfer influence. For example:

王明达下班下午五时三十分汽车。
Wāng míngdá xiàbān xiàwǔ wǔshī sānshifēn qìchē.
Wang Minda balik kerja pukul 5.30 petang menaiki kereta.

早上 七 点 , 王 明达 早餐 以前 上班 。
Zǎoshang qī diǎn, Wáng Míngdá zǎocān yiqián shàngbān.
Pukul 7.00 pagi, Wang Mingda sarapan sebelum pergi kerja.

As for direct translation errors, we found that ten out of fifty-seven students fall into this sub-category.

Example:

从王明达的家开车去上班要狠多高楼大厦。
Wang mingda dari rumah pergi kerja menaiki kereta banyak bangunan tinggi.

早上 七 点, Wang Minda 吃饭 以前 去 上班。
Pukul 9 pagi, Wang Minda makan sebelum pergi pejabat.

早上七点半, 王明达在办公室开车。
Pada pukul 7.30 pagi, Wang Mingda pergi pejabat menaiki kereta.

我喜欢在红毛丹树下里睡觉。
Saya suka tidur di bawah pokok rambutan.

早上七点半, 王明达在办公室开车。
Pada pukul 7.30 pagi, Wang Mingda pergi pejabat menaiki kereta.

And there are ten out of fifty-seven students made mistake in Grammar. We categorized them in others as their grammatical mistakes were of various kinds and complicated.

Example:

下午 两 半 点, 王 明达 很 忙 见 客户。
2.30pm, Wang mingda sangat sibuk jumpa dengan pelanggan.

王明达的家吃早餐吧。
Wang Mingda makan sarapan dirumah pada pukul 7 pagi.

Task I is less challenging due to the fact that the students did not need to construct their own sentences, as they only referred to the sample sentences and then typed them out using correct Hanzi. Since a whole sentence in Chinese characters was displayed before them, they could easily recognize its separate characters and also punctuation. Therefore, they only tried to recall the pinyin and then type them out. Next, they would choose the correct characters one by one from a list of Hanzi displayed on the screen. However, we still found that two students out of the total of fifty-seven students used the wrong character, while one out of fifty-seven students gave extra Hanzi.

Example:

我 不 是 **去噢（中国）**人, 我 是 马来西亚 人**[。]**

去 qù　中 zhōng

噢 ào　国 guó

By looking at the characters involved, they are very much different from others. We assumed that the students involved did not have any idea regarding their pinyin, or they remembered the pinyin wrongly.

Basically, errors done in this category are due to their carelessly and also because they did not examine their work properly after they typed out the sentences. Besides this error, we found that a total of 27 students out of fifty-seven did not use punctuation. Even though they were shown sample sentences together with their punctuation; they simply left out the punctuations. Hence, we can foresee the importance of introducing the Chinese punctuation to the students in their Mandarin Course. It is of vital importance to show them that besides comma ‘，’ and full stop ‘。’ the Chinese punctuation has another shorter pause than comma, that is ‘、’. Other than this, the Chinese way of writing full stop is also different from the common practice in English or Bahasa Malaysia. We usually use a small round circle shaped like the number zero ‘。’ instead of dot ‘.’.

And for Task II, we found that the frequency of errors from the five categories are much higher than Task I. This is unavoidable since in Task II, students were asked to construct their own sentences using the Hanzi that they have already learned from chapter one to three. This time, no sample sentences were given. According to our findings summarized as in Table 3.1, we found that the major problem with the students was of category character, especially in sub-category homograph/homophone/homonym. There are altogether twenty-two out of fifty-seven students that fell into this sub-category. They had these problems partly due to the complexity of the nature of Chinese character and pinyin. As generally acknowledged, Mandarin is rich in homographs, homophones, and homonyms. This problem is further heightened due to its pinyin element, since same Romanised spelling may produce a list of different Hanzi, not to mention different tones can also produce a wide variety of Hanzi plus same pinyin and same tones can also imply different Hanzi.

Besides characters, again, the frequency of not using punctuation was quite high in Task 2. Perhaps the instructor needs to give more emphasis on Punctuation. Lastly, due to mother tongue negative transfer influence, the mistakes done in separate sub-categories in Grammar and also category Semantic

and Sentence correctness are quite obvious. Particularly, there were errors due to inappropriate and incorrect translations. Among these errors, we found that correctness in sentences is the most serious.

By referring to the results acquired, we suggest that in order to improve the quality of Mandarin teaching as a third language, students need to have more exposure in Chinese Pinyin. Besides, tones must be given ample emphasis as well. Since current textbooks do not give sufficient allocation on theme regarding the learning of Pinyin and tones, this can further pose a big obstacle to the learning of Mandarin particularly to the L3 learners.

Furthermore, a full coverage of introducing the Chinese character to L3 learners is also a must as learning Mandarin involving a series of complicated thinking processes, especially the higher order thinking skills (HOTS) as shown in Table 4.2. These processes are only regarded as complete when students manage to incorporate the 'sound',' meaning' and also the 'form' as a whole (refer to Chu & Toh 2014).

Table 4.2. Constructs of Hots on Chinese character learning through WhatsApp

Category	Definition	Keywords	Example
Evaluation (E)	Judging whether the sentences are correct	Judging Appraising Evaluating Assessing	中 国 茶 恨 好 喝 。 中 国 茶 很 好 喝 。
Synthesis (S)	Combining the separate components which make sense	Composing Constructing	中+ 国 = 中国 好 + 喝 = 好喝
Analysis (AN)	Determining the correctness of components	Comparing Contrasting Examining Analysing	中、种、钟、重、众、忠、终 国、过、果、郭、锅、裹、帼
Application (AP)	Applying knowledge in making phrases	Interpreting Applying Using Demonstrating	

Comprehension (C)	Interpreting the meaning of each character	Restating Discussing Describing Explaining	
Knowledge (K)	Memorizing basic strokes: 丶, 一, 丨, 丿, 乀, etc.	What? Defining Recalling Listening	

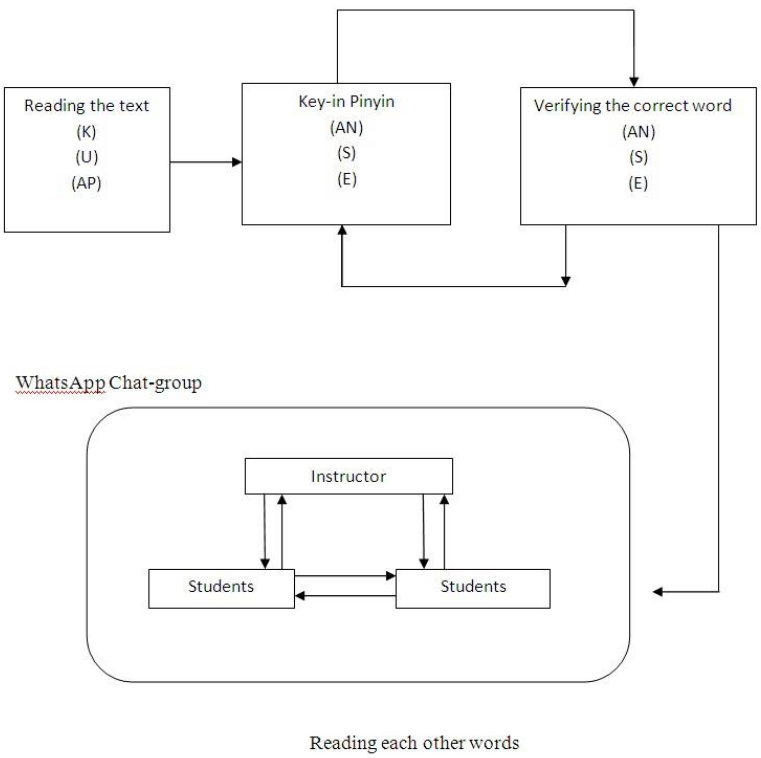


Figure 4.3. Overall process of stages 3 & 4

This research is based on the idea of promoting thinking skills through (ICLM) using WhatsApp in order to help the L3 learners to master Mandarin. Referring to Figure 4.3 Overall Process for stage 3 & 4, we can see that for both Task I and Task II, we involved students in using higher-order thinking skills to complete their tasks. Even though for reading the text in Task I, the thinking

processes only involve knowledge, understanding and application, but when it comes to the keying-in the separate characters, students need to first analyse the characters in their proper forms to the minute details so as to get their correct 'sound'. For example, '人' rén (human being) and '八' bā (eight) both look alike. Hence, the students need to determine which one is the correct one that they are looking for. This process definitely involves the thinking process of analysis.

However, if students look closely, they will see the small difference between '人'and '八'. Then they will decide the correct pinyin for the character shown. This process involves first analysing the 'form' and next evaluating the correct character. Then only they synthesize the Pinyin. However, after they have synthesized the Pinyin using WhatsApp pinyin system, a list of possible characters will be displayed before them. Then they need to analyse character by character pertaining to form and minute details and hence evaluate which form is the one that they are looking for. After that, then only they choose the correct character. This process basically comprises analysis the form, examining the correct form (evaluate), and deciding the correct form (synthesis).

Nevertheless, this process of thinking through Task I and Task II is not yet completed. The students then submit their tasks through their WhatsApp chat-group to the instructor and their works are viewed also by all the group members. Then their works will be evaluated by the instructor and also by other group members. The instructor will examine the tasks one by one. After the instructor has finished checking all the tasks, the instructor will send the corrected or examined tasks back to the WhatsApp chat-group. Then all group members will have a chance to evaluate and analyse not only their own works but also other group members' works. Hence, the advantages are double-folded. Through this processes, L3 learners are exposed to ample examined sentences. Then the whole thinking processes once again are in action. The students will compare the original sentences with the examined sentences, analysing the differences, evaluating the improvements and then they will synthesize the whole sentences again for correction purposes, using WhatsApp as a set of activities involving thinking processes, particularly the higher-order thinking skills (HOTS).

For illustration, we give a sample sentence here: Task I (refer to Figure 4.2)

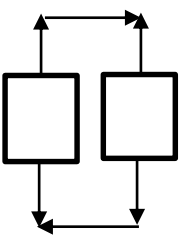
Reading the text " 中国茶很好喝。"

Knowledge

- Students' knowledge of the characters: 中,国,茶,很,好,喝
- Students' knowledge of Chinese punctuation: 。，、
- Students' knowledge of eight types of strokes in Chinese character: 丶，一，丨，丿，乀，etc.

Understanding and Application

- Students' understanding of the characters:
  中国
  when we combine the two characters (noun), it becomes a proper noon, i.e. China.
- Students' understanding of character combinations to form different parts of speech, such as nouns, adjectives and so on:
  茶 tea,
  很 very,
  好(adjective) 喝 when combined it, give the meaning of good to the taste or tasty
- Students' understanding of Chinese Punctuation full stop: 。



Repeating Analyse, Synthesis and Evaluate

- Student starts looking for correct Pinyin.
- Keying-in Pinyin and verifying the correct word:
  中国 type z+h+o+n+g
  A display of: 中、种、众、钟、重、肿、仲、忠、终…
- Students analyse every character to the one in the textbook. They evaluate them one by one and then decide and pick the proper one.
- This process involves (AN, S, E) and it will keep on repeating when the students go for the next characters.

Once it is completed, the student will send "中国茶恨好喝" to the WhatsApp chat-group. All group members including the instructor will receive his or her sentence and read. Then the instructor will evaluate the sentence given and makes corrections if any before the instructor discuss the sentence with the group.

Original from text book " 中国茶很好喝。"
Students' task "中国茶恨好喝"

All students are involved in evaluating and analysing the corrected sentence. They will examine 很 and 恨， then they will try to find out the difference. The instructor will then make a clarification of examine 很 and 恨, states their different radicals: ' 彳 ' and ' 忄 ', then their different tones: 很 (hěn), 恨 (hèn). This process will go on for the other fifty-seven sentences. Hence, the group will then have the opportunity of learning altogether fifty-seven sentences in one session, coupled with the process of Higher-order Thinking Skills.

5. Concluding Remarks

We have found that after using the ICLM for Chinese characters in this study, a majority of the students in the sample showed greater enthusiasm in learning Chinese character. Moreover, they found learning Chinese character through ICLM interesting and meaningful as they started 'seeing' subtle differences in stroke positions or lengths which could really bring forth different characters with different meanings. They were more prepared to analyse each and every stroke with great care and hence, their combination so as to differentiate the suitable characters that they were looking for in constructing sentences. Through this process, they have indirectly inculcated HOTS in determining correct characters from the character list provided by the screen.

Our study shows that by using ICLM, the problem of inadequacy in learning and practicing time was compensated partially. Hence, we managed to create a native-like learning environment for L3 learners. All in all, we would like to clarify that even for L1 Mandarin learners, when come to learning Chinese

characters, they still need to go through a tedious and time-consuming process over their six-year study period in primary school.

For further investigations, we suggest that after L3 learners have acquired sufficient knowledge in both pinyin and strokes, and should now use "笔画输入法" (hand writing input) instead of pinyin to key in their tasks. We believe that though this manner, it will eliminate the errors done by the students due to homograph, homophone, and homonym. Besides, we also believe that this will further enhance their memory of the correct Hanzi.

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