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Student- Oriented-Learning Strategy for Learning Chinese Numerical Proverbs Based on Natural Language Processing Online Database

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Abstract

As a result of the global advancement of Intelligence technology, a growing number of academics are attempting to enhance their classroom innovation by employing a variety of virtual learning strategies. In the past 10 years, numerous experts have sought to innovate the language-learning process by advocating a shift from teacher-centered to student-centered instructional approaches. As one of the most difficult languages in the world, Chinese is steeped in history and culture that dates back thousands of years. Students' ability to comprehend the semantic meanings of proverbs is influenced by these traits. In order to increase students' comprehension and application of Chinese numerical proverbs, this study will present an innovation method based on a Natural language processing online database, which will serve as an online platform for non-native Chinese learners learning Chinese proverbs. This online database, referred to as the Thousands of Chinese Studies website, can assist learners in obtaining comprehensive information on Chinese numerical proverbs, thereby saving search time and enhancing study efficiency.

This study employs an enhancement task design for learning numerical Chinese proverbs in order to compare the amount of knowledge acquired through student-centered learning strategies by using online resource which has been well developed and can be effectively functioned through natural language processing searching keys. This is an experimental study related how to use online resource to lead the learners to acquire knowledge of Chinese numerical proverbs through enhancement tasks designed by the researchers of this study.

This study will shed light on how the enhancement tasks designed by this study can be used to measure meta-learning abilities of learners in comprehending numerical concepts of Chinese proverbs based on online language resources, and adopting proper knowledge to conduct homework related to Chinese proverbs.

Keywords: *Student-oriented-learning; Natural Language Processing; Chinese numerical proverbs; meta-learning*

1. Introduction

1.1 Definition of Natural Language Processing

Natural Language Processing (NLP) is the computerized approach to analyze text based on theories and technologies (Elizabeth D. Liddy, 2001). Meanwhile, it has always been used to analyze and represent naturally occurring texts at one or more levels of linguistic analysis to achieve human-like language processing for various activities or applications. In this study, NLP can be used as an online platform for language learners to learn Chinese proverbs.

1.2 Definition of Chinese numerical proverbs

The Chinese numerical proverbs are a distinct subset of Chinese proverbs. The recognition of numbers in proverbs and the profound connotations reflect Chinese ancestors' cultural thoughts on many important issues (primarily philosophical and sociological ones) related to the ancient Chinese society. Hence, the accurate definition of Chinese numerical proverb is that it is a type of traditional Chinese idiomatic expression, most of which consist of four characters and two characters are figures. Numeral conceptions of Chinese proverbs can be categorized into different semantic meanings such as “cause and effect”, “plurality”, “all sort of ”, “few”, “unhappy event”, “traditional ethical practice ”, “talent”, “identity of ancient people”, “career”, “rhetorical style”, “perfect level”, “a mess” and “direction and locality”. Meanwhile, Chinese numerical proverbs carry three layers of meanings- literal, semantic and cultural meanings. For example, in “五花八门”(miscellaneous), the literal meaning is “five flowers and eight doors”, and semantic meaning is “all kinds of” , and for cultural meaning is that "五花"

refers to five characters in Ancient Chinese alchemy which includes gold, wood, water, fire and soil. The term of "八卜"refers to "Bagua Zhen" in ancient Chinese geomantic omen which includes eight directions- Northeast, Northwest, Southeast, Southwest, North, South, East and West. The cultural meaning of this proverb indicates “many and manifold”, normally refer to social changes in ancient Chinese society. The literal and semantic meanings can be explained by NLP but except cultural meaning of numerical proverbs.

1.3 Connections between Natural Language Data Processing and Chinese Numerical proverbs

Thousands of Chinese Studies is one of online resources which can better help non-native learners to study Chinese numerical proverbs.

Learners may use a student-centered learning skill which is proposed by this study to help non-native non-native Chinese learners to learn semantic meanings of Chinese numerical proverbs through NLP searching functions.

1.4 Research Objectives

The objectives of this study focused on knowledge relate formations and structures of Chinese numerical proverbs, applications of NLP and student- centered learning skill to help non-native language learners for comprehending semantic meanings of Chinese numerical proverbs. There are three research objectives in this study:

1. To explore formations and structures of Chinese numerical proverbs
2. To analyze numerical conceptions conveyed by Chinese numerical proverbs
3. To examine non-native learners in comprehending literal, semantic, and cultural meanings of Chinese numerical proverbs through enhancement tasks.

2 Literature Review

2.1 Natural Language Processing

The NLP translation of Chinese numerical proverbs lacked cultural contexts since the translator ignored cultural meaning of numerical conception, for example, "低三下四" (humble) means "drop 3 or 4 pegs," the numeral conception of this proverb ignored well explained in the level of literal meaning. Language learners can further search semantic meaning of this proverb through the NLP searching functions and online resources related to Chinese proverbs such as Reverso and *Chengyu* Great Dictionary. This NLP searching functions and online resources help researchers understand the numeral conception of "three" and "four" are used to indicates attitude lower social status people. Meta-learning strategy is one of the learning skills can be applied in Chinese classroom to examine comprehending ability of non-native Chinese learners in reflecting semantic meanings of Chinese numerical proverbs through oral and writing expression.

2.2 Chinese numerical proverbs

In recent decades, online dictionaries became one of the popular learning and teaching materials for non-native Chinese learners to obtain knowledge about Chinese proverbs, however these materials have limitations due to the large quantity of Chinese proverbs had been created during each era of Chinese history.

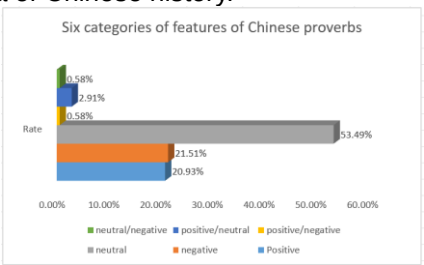

Fig.1: Six categories of features of Chinese proverbs

Characteristic in Chinese numerical proverbs refer to the language features of Chinese proverbs. According to the Fig. 1, Chinese numerical proverbs can be divided into six categories. Consisting neutral meaning is majority, followed by language features reflecting negative meaning proverbs, third is proverbs expressing positive meanings, fourth is proverb indicating positive and neutral meanings, and the last two are the proverbs carrying neutral and negative meanings and, positive and negative meanings.

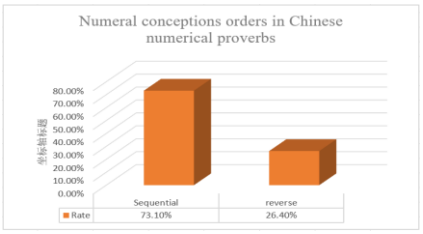

Fig.2: Numeral conceptions orders in Chinese numerical proverbs

Fig 2 illustrated the figure orders of Chinese numerical proverbs, they are two types, mostly are sequential, small figure followed big figure like “一举两得”(serve a double purpose). Another are reverse, big figure placed before small figure, for instance, "九死一生" (barely to avoid death).

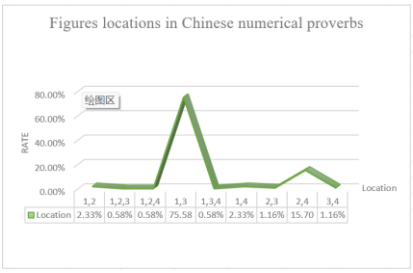

Fig.3: Data collection of Chinese numerical proverbs’ location and structure

There are eight locations of figures can be found in Chinese numerical proverbs, the first combination is located in the first and third characters, such as “五大三粗”(big and tall), the second combination is placed in the second and fourth characters, like “独一无二”(the one and the only).

3. Methodology

3.1 Natural Language Processing method

NLP is a subfield of AI that helps people and computers communicate. It evolved from Machine Translation (MT) during World War II (1999). First, computers were used to translate human languages like Chinese to English. Information is sent via the combined symbols of data. Converting human language to computer language made communicating with machines easier. In this study, NLP can facilitate non-native Chinese learners to learn Chinese numerical proverbs through online data resources.

3.2 Natural Language Processing Application

NLP integrates computational linguistics (modelling of human language based on rules) with statistics, machine learning, and deep learning models. Together, these technologies allow machine to interpret human language in the form of text or speech. NLP can help non-native Chinese learners understand Chinese numerical proverbs in various aspects. For example, the Thousands of Chinese Studies website used the NLP approach as a theoretical framework to explain knowledge and semantic meaning of Chinese numerical proverbs such as amounts of characters to form proverbs, grammatical functions and rules to form proverbs, structures of the proverbs, literal and semantic meanings of proverbs, and so on. Through this information, non-native learners can understand the formations, structures and semantic meanings. In this study, enhancement task is used to identify correctness of non-native Chinese learners in comprehending semantic meanings of Chinese numerical proverbs through various translation methods.

In addition, there are few online resources applied NLP methods as searching functions, such as Reverso, one of the online data resources focuses more on languages used to apply translation methods to help language learners for comprehending semantic meanings of Chinese numerical proverbs. literal and semantic meanings of Chinese numerical proverbs.

3.3 Student-Oriented Learning

Student-oriented learning aims to build learner autonomy and independence by giving students the skills, foundation, and schemata needed to achieve performance objectives. Students will learn how to use *Hanyu Daquan* (《*汉语大全*》) (A complete collection

of Chinese) search engines to self-study Chinese numerical proverbs online and enhance their skills. This study illustrates how successfully respondents use NLP to learn Chinese numerical proverbs.

3.4 Enhancement Task

Enhancement task is adopted to examine the comprehending ability of non-native Chinese learners in perceiving literal, semantic and cultural meanings of Chinese numerical proverbs through NLP searching functions and students-centered learning skill. In this task, there are 12 questions related to literal and semantic meanings of Chinese numerical proverbs. The target respondents of this study are Malay and Indian learners.

Target respondents will be given 30 minutes to answer this enhancement task. They are allowed to use NLP searching functions from the internet and refer to online resources to search and learn the knowledge, formations, structures and semantic meanings of Chinese numerical proverbs showed in the enhancement task. They will apply student-centered learning skill to acquire literal and semantic meaning of Chinese numerical proverbs showed in the enhancement task. These respondents are without knowledge of Chinese numerical proverbs before they participated in this task. They only have basis Chinese language proficiency to recognize the characters formed from the Chinese numerical proverbs. Each questions in this enhancement task is showed in the Fig 4:

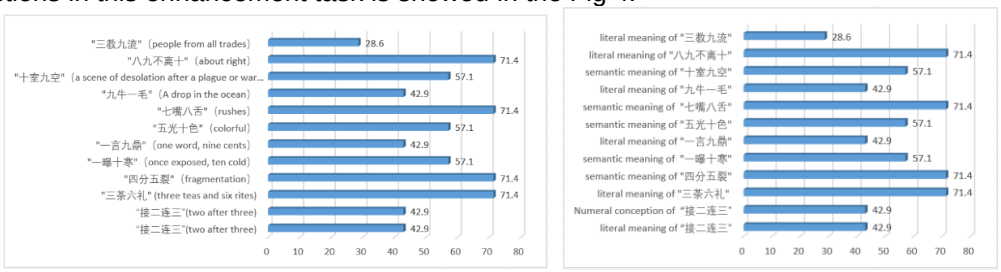

Fig. 4. The Correctness of Target Respondents in Perceiving Literal and Semantic Meaning of Chinese Numerical Proverbs

The statistical figures show in the Fig.4 reflected the correctness of each question answered by the target respondents.

4. Research Findings and Discussion

From the respond of target respondents, this study can summarize the research outcome below:

To perceive the literal meaning of “接二连三”(two after three), almost 40% of respondents were able to comprehend the literal meaning of this proverbs. To comprehend the numeral conceptions of “接二连三”, almost 40% of respondents were able to answer correct. To perceive the literal meaning of “三茶六礼”(three teas and six rites), almost 70% of respondents were able to understand the literal meaning of this proverb and its cultures. To understand the semantic meaning of “四分五裂”(fragmentation), almost 70% of respondents were able to comprehend the semantic meaning of this proverb. To comprehend the semantic meaning of “一暴十寒”(once exposed, ten cold), more than 50 % of respondents were able to answer the semantic meaning of this proverb correct. To identify the literal meaning of “一言九鼎”(one word, nine cents), almost 40% of respondents were able to guess correct. To perceive semantic meaning of “五光十色”(colorful), more than 50% of respondents were able to comprehend correct. To guess the semantic meaning of “七嘴八舌”(rushes), more than 70% of respondents were able to answer correct. To comprehend the literal meaning of “九牛一毛”(a drop in the ocean), almost of 40% were able to provide accurate answer. To perceive the semantic meaning of “十室九空”(a scene of desolation after a plague or war when the population is decimated or fleed), more than 50% of respondents were able to guess correct. To perceive the literal meaning of “八九不离十”(about right), more than 70 % of respondents were able to choose the correct answer. To perceive the literal meaning of “三教九流”(people from all trades), less than 38% of respondents were able to provide correct answer.

The research finding of this study showed that non-native Chinese learners were able to comprehend the literal and semantic meanings of Chinese numerical proverbs through the NLP searching function and the knowledge of online resources. The translations' method adopted by the translators and the editors to explain literal, semantic meanings of Chinese proverbs and various languages especially in English helped the respondents further understood the actual meaning of Chinese numerical proverbs either literal or semantic meanings. Translation methods also played an important role into guide the respondents comprehend numeral conceptions of Chinese numerical proverbs, therefore, they were able to perceive the numeral conceptions of the Chinese numerical proverbs in this enhancement task. The target respondents were able to adopt student-centered learning skill to find out the knowledge related to the formations, structures, literal and semantic meanings of Chinese numerical proverbs in the enhancement task. Only the respondents were not familiar and understand the actual meaning of numeral conceptions of Chinese numerical proverbs. They found low percentage of correctness in comprehending the literal meaning and semantic meanings of Chinese numerical proverbs such as the proverb-"三教九流".

Meta-learning skill helped target respondents knew how to choose the correct answer to reflect literal and semantic meanings of Chinese numerical proverbs. They noted down their understandings about the actual meanings of Chinese numerical proverbs through writing short notes in their enhancement task, so that the Chinese teachers could examine their comprehending abilities through their writing notes.

Concluding Remarks

Comprehending the numeral conceptions is the important key for understanding literal and semantic meanings of Chinese numerical proverbs. The NLP searching functions, online resources and students-centered learning skill can be applied in the Chinese classroom to help non-native Chinese learners without high Chinese language proficiency to learn knowledge and semantic meanings of Chinese numerical proverbs independently. This study revealed that non-native Chinese learners were able to comprehend literal and semantic meanings of Chinese numerical proverbs through this learning methods. To enhance comprehending ability of non-native Chinese learners, enquiring knowledge of Chinese numerical proverbs, more enhancement tasks should be designed and developed. In order to guide them more familiar to the searching functions of NLP, meta-learning skills used in reflecting the literal, semantic and cultural meanings of Chinese numerical proverbs through reading online original texts.

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