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## Mastery of Mandarin Tone Sandhi by UiTM Introductory Mandarin Learners

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### ABSTRACT

Tone is a distinct Chinese feature that is both difficult and important in Mandarin, with Tone Sandhi being the most difficult. Mastering tone sandhi is synonymous with mastering Mandarin. Knowing the learning situation among students is essential for assisting them in mastering the language more effectively. The purpose of this quantitative study is to investigate the tone sandhi mastery situation among Mandarin learners at UiTM, with the hope of improving the quality and effectiveness of Mandarin teaching and learning by implementing appropriate teaching methods. 49 Mandarin students from 3 different levels of Introductory Mandarin courses in UiTM participated in this quantitative tone sandhi study. A structured questionnaire involved demographic sections, theoretical sections, and reading recording section was distributed. The data revealed that students' theoretical knowledge is adequate, but their ability in practical pronunciation needs to be improved. Several teaching methods were listed, with the hope that they will aid in the teacher's teaching and, in turn, improve students' tone sandhi pronunciation ability.

#### **Keywords:**

Mandarin learning, Introductory Mandarin,  
Tone Sandhi, Modern Chinese phonetics, Tonal  
Teaching and Learning

### 1. Introduction

Pronunciation is the most difficult and important aspect of learning a foreign language because it is the linguistic quality of the language itself. The grammar and vocabulary will be incorrect if the pronunciation is incorrect [2]. Tone is a unique characteristic of Chinese, which is considered as difficult and important part in Mandarin, in which the Tone Sandhi (Change of Tone /Tone Modification) is the most difficult. Tones have a role in distinguishing meaning in Mandarin.

At the suprasegmental tonal level, Chinese has four basic tones as well as a short and weak neutral tone. Traditionally, the four basic tones are called Yinping, Yangping, Shangsheng, and Qusheng [3]. In Chinese language learning, the mastering in tone is really important. Beside the four tones, the changes of tone are also important. However, there are still so many people who don't understand or even don't know about this tone changes.

The tones of a word sometimes have to be modified, depending on the tone of the syllable that precedes or comes after it. This type of changes is what we term as tone sandhi. The Mandarin Chinese language undergoes tonal changes in the flow of speech, and there are certain patterns to

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these changes. The most common tonal changes include the tone sandhi of third tone and the Yi tone, Qi tone, Ba tone, Bu tone [10].

Tone sandhi in Mandarin is usually not written down and learners usually do not see them marked in Pinyin. This is because although certain tones sometimes change in various ways, these context-dependent changes do not alter the original tone of the characters when being written in isolation. The original tone of each character is written in Pinyin, regardless of the context, to make it easier to identify the original tone of each character.

According to the Introductory Mandarin syllabus, tone sandhi is the hardest to learn for UiTM Mandarin class students, especially tonal modifications of the third tone, Yi tone and Bu tone. Therefore, this study will analyse students' mastery of tone sandhi based on actual classroom teaching. The purpose of this study is to reveal the problems in acquisition of these modifications among the UiTM students, to analyse existed errors using methods of International Phonetic Alphabet, analyse errors' reasons and put forward some suggestions on possible teaching methods.

### *1.1 Statement Problems*

Tone is extremely important in Mandarin, especially for students studying Mandarin at UiTM. Apart from looking at the characters themselves, the only way to distinguish one word from another when the spelling of pinyin looks the same is through tonal difference. For example: 包 bāo , 薄 báo , 饱 bǎo , 抱 bào, these four Chinese characters all have the same pinyin , the only difference is the tone sandhi of the words and that's the only way to know the meaning of the words. Furthermore, tone sandhi accuracy reflects whether a person speaks Chinese authentically. Tone mastery is unquestionably a difficult task for students. Even students who have been studying Mandarin for a long time will appear "unpretentious" when speaking the language. Furthermore, they will have different meanings due to differences in the sounds of the words or phrases, resulting in unnecessary misunderstandings during actual communication. As a result, tone teaching is crucial in Mandarin learning and teaching. Then, how to ensure students' correct pronunciation in Mandarin class became a critical issue. The tone sandhi teaching method has a direct impact on pronunciation learning and mastery.

In Malaysia, research on the status of tone sandhi acquisition is severely lacking. Tone sandhi appears frequently in the UiTM Introductory Mandarin textbook. Therefore, this article will concentrate on the study of tone sandhi of Mandarin as a foreign language in UiTM Mandarin class, identify problems, and propose teaching suggestions that will aid in the teaching of Mandarin class and students' learning.

### *1.2 Objective*

The goal of the research is to investigate the tone sandhi learning situation among students enrolled in the Mandarin course as a third language at UiTM, and hopefully, by implementing appropriate teaching methods, to improve the quality and effectiveness of Mandarin teaching and learning.

### *1.3 Research Question of The Study*

To address the above issues, this research questions seek to answer:

1. How accurate are students' Mandarin pronunciations?

2. Does students mastering the theory of Tone Change?
3. What are students' perspective towards Tone Change in their Mandarin leaning?

## 2. Literature Review

In Chinese linguistics, tone sandhi has been investigated for a long time. The pronouncing dictionary Zhongyuan Yinyun is the earliest to refer to tone sandhi in the 14th century. The author, Zhou Deqing, noted that "it would be best to avoid a pair of rising tones or a pair of Departing tones."

For the study of the tone sandhi in modern times, we can start with Chao's research. Chao designed a five-level numerical scale to represent the pitch height, ranging from 1 through 5 with the latter being the highest pitch level. In this representation system, the four basic tones are labelled as "55", "35", "214", and "51" respectively [1]. This method of marking tones defines the tonal range of the tones for us.

Chao [1] also described a phenomenon in Chinese, when two T3's are adjacent to each other in sequence, the preceding T3 will change into T2 when it is immediately followed by another T3 in phrasal context. The tonal change has been known as the Third Tone Sandhi in Mandarin. Tonal change means that every tone includes a basic form as well as a corresponding transformed tone, and is conditioned in morphology, like in Cantonese [27].

Shen [19] mentioned that tones are affected by both carryover and anticipatory coarticulation. Not only are tonal onsets and offsets affected by coarticulation, but entire tonal contours are shifted up or down by the surrounding tones.

In Ye's [26] paper, the researcher investigated the perception and output bias of the falling-rising tones of international students from beginner, intermediate, and advanced levels of Chinese, using cognitive and acoustic experiments. The researcher described and analysed the learners' errors from five aspects: tonal pattern, tonal range, falling-rising tone duration, inflection point position and fifth value. In addition, a questionnaire survey was conducted to investigate international students' strategies for learning vocal tones. After analysing the results of the questionnaire to understand the use of social, affective, meta cognitive, cognitive, and compensatory strategies by learners at different levels, suggestions for teaching tone strategies were proposed.

As various theories have been established, many scholars have also begun to study tone sandhi in the classroom. Li and Yue [14] research uses survey analysis methods explores the subject of tone sandhi from a new perspective. This study deals with the problem of mark signs for modified tone in writing Chinese textbooks for foreigners. Neither history of the scheme and usage used in the writing of Chinese textbooks by foreign scholars, nor the history of scheme and usage used in the research of Chinese tones by Chinese scholars have shown that the teaching of modified tones for foreigners could be replaced by the researches of modified tones. The author recommend to take into account of both the tonic and the variant, specifying the actual pronunciation in the specific context.

Shao [18] combines knowledge of phonological ontology with an empirical approach based on the basic laws of phonological variation in speech flow, arguing that upper voice prosody is simply a change in tonal value. She suggests that in teaching, attention should be paid to upper tone prosody in the first of two syllables, three syllables and connected prosody in four or more syllables.

According to Ma [16], the importance of the sense of speech in learning to change tones is enormous. Students gradually develop an unconscious awareness of tonal recognition through a lot of practice in hearing and listening to tones, so that they can correctly identify tones. She believes that it is important to analyse the factors that influence tonal recognition in order to guide international students to overcome the obstacles and to make use of the favourable factors in order

to improve their tonal recognition skills. For international students who have no basic knowledge of the Chinese language, the majority of Chinese words are bisyllabic, and mastering the modulation of bisyllabic words is basically mastering the continuous modulation of Chinese.

In the study of the T3 Sandhi on native Mandarin speakers, Zhang and Lai [27] showed that native Mandarin speakers applied greater accuracy with the phonetically more motivated Half-T3 Sandhi than with the phonetically less motivated T3 Sandhi. This was later confirmed by Yang [25] in his study of Level 2 Chinese T3 acquisition by English speaking learners with the finding of a significantly higher accuracy rate for Half-T3 Sandhi than for T3 Sandhi.

The study by Wang, Yu, Li, Zhang and Yang [23] investigated 43 Mandarin-speaking children's tone sandhi acquisition under the framework of Experimental Phonetics. It is found that children's tone sandhi of rising tone and the tone of Bu 不 are acquired earlier than the tone of Yi 一. Moreover, children tend to prioritize the use of the original tone in the process of acquisition.

Wang [24] article aims to help enhance classroom teachers' understanding of Mandarin tones by sharing the author's linguistic insights especially on Tone 3, with a new perspective on its low-tone features, and its phonological subcategorization and descriptions. The author pointed out the limitation of currently used tone marks on top of the Pinyin letters, and proposed to use a new set of "Prosodic Tone Marks" directly on the characters of a Chinese text, with richer tonal information such as tone variation, half-T3 before and after a stressed syllable, and with better iconic effects. In addition, the tone marks should be designed as graphically as possible to produce an effective visual effect.

Lian [15] thesis systematically investigates the interaction of emphatic focus (EF) and Mandarin third tone sandhi through an empirically comparative study between normal focus (NF) and emphatic focus (EF), by means of phonetic software Praat. This study controls the experiment sample from four factors concerning syntactic structures, syllable number, focus types, and tonal sequences. The results of the study show that: 1. The emphatic focus does exert the blocking effect on the application of Mandarin tone sandhi. The effect of emphatic focus on tone sandhi through changing the sandhi domain. 2. It supports the claim that the emphasized syllable may not always carry the underlying tone as the surface tone: it either bears the underlying tone or the sandhi tone. 3. The emphatic focus does have a significant effect on the duration of the phrase, compared with the normal focus. There is no duration difference for the final two syllables. The emphasized syllable tends to be lengthened.

According to Deasy, Lily and Bun [5], this study is aim to examine if the comparison method could help students. Based on the data collected, student not only understand but also mastering the tone changes of Yi 一 and Bu 不. After the learning process, there is a significant progress about the test result. There are two parts in this test, the first part contains a simple phrase of Yi and Bu tone changes, has a progress at 26.64%, and the second part which contains sentences about Yi and Bu tone changes, has a progress at 16.53%. This means the method is really helpful in the learning Yi and Bu tone changes.

In recent years, Jin's research on tone sandhi has developed further. Jin [12] proposed and examined two phonetic principles in the acquisition of Chinese Yi and Bu tone sandhi by English-speaking learners in the U.S.: "\*Conflicting Context >> \*Compatible Context" and "Complex Contour \*T3 >> Simple Contour \*T2". The results of the analysis revealed the governing effects of these principles in the process of Level 2 tone sandhi acquisition and also provided new evidence from the perspective of Level 2 acquisition that Chinese T3 is more marked than T2.

In addition, another of her studies also showed that examines the acquisition of five Chinese tone sandhi, including Yi, Bu, T2, Half-T3, and T3 Sandhi by English speaking learners of Chinese. Investigation results show different acquisition patterns for the various sandhi processes and learner levels, revealing thereby multiple factors at play in Level 2 learners' acquisition of the tone sandhi:

the instruction factor, phonetic motivation, learning effect, inherent intra-lingual factor, and interference from English intonation.

Based on speech errors of foreign students, Deng [6] discussed the problems of Chinese phonetic study and pronunciation teaching in Teaching Chinese to Speakers of Other Languages (TCSOL). The problems included sound shift and tone teaching. The researcher suggested that the four tones of Mandarin can also be compared to the main features of the tones “high, rising, low and falling” in the teaching of tones to foreign learners of Mandarin. Gao [8] used comparative analysis and survey sampling to find out the pattern of phonetic errors of Korean students learning Chinese and to improve the study of the phonetic system of both sides.

Li’s [13] article focused on text-reading demonstration to provide standard voice demonstration for primary and secondary school students and teachers. Students of different ages have different cognitive level and reading ability. Apart from phonology, the phonetic change during reading is particularly important. From the perspective of tone-changing reading, the paper elaborated the grasp of sound-changing laws of the reading-demonstration recording of Chinese text in primary and secondary schools. The author's emphasized on not marking the change of tone as it is the learning requirements of the written language. However, reading aloud a demonstration recording without a change of tone will cause the loss of rhythmic beauty of Mandarin, and may even mislead the students.

Ou [17] suggested the use of Mandarin chanting as a method of teaching Mandarin. By exploring the path of “Yi” from the perspective of Mandarin training and testing, the author can help students to successfully pass the Mandarin exam. The article is of great relevance to the promotion of Mandarin for all and the popularization of Mandarin as proposed in the *Mandarin Training and Testing*.

The importance of Chinese tonal system and its current research and pedagogy status in the field of Introductory Mandarin in UiTM acquisition call for more empirical studies. However, acquisitional studies on this tone sandhi in the field of mandarin class UiTM are very limited. Even though they are most frequently used in daily speech, there is barely any research on the acquisition of Yi and Bu sandhi. Therefore, this study investigates one of the understudied issues in mandarin class UiTM. Identifying problematic areas and formulating targeted teaching strategies is definitely a more productive approach.

### **3. Methodology**

Tone teaching is primarily used in listening instruction to help students listen accurately and quickly, and then to differentiate meaning. On this basis, the tone sandhi teaching should then further guide students in distinguishing the different types of tones in speech changes. Additionally, assist students in overcoming obstacles and utilizing favourable factors to improve their ability to hear tones and, as a result, guide their own tone pronunciation, in order to improve the teaching effect of Chinese tones as a foreign language.

It is necessary to study students' learning situations in order to uncover problems and then develop targeted teaching programs based on the problems in order to improve the feasibility of teaching and the effectiveness of learning.

#### **3.1 Research Method**

Researcher applied a quantitative research method to this study through a questionnaire. A

group of 49 students were chosen to take part in the study, and they were given a structured questionnaire to complete within a week. With the chosen descriptive research design, the researcher should be able to gain a better understanding of the research problem.

### 3.2 Participants

To gain an initial understanding of the population, the study employs non-probability sampling techniques. Voluntary response sampling being used to recruit 49 Mandarin learners from 3 different levels of courses in UiTM participated in this study. 20 of them are from TMC401, students who are taking Introductory Mandarin Level 1. 11 are from TMC451, students who are taking Introductory Mandarin Level 2 and 18 are from TMC501, students who are taking Introductory Mandarin Level 3. Voluntary response sampling being

The participants were chosen based on certain criteria, in which students must have taken TMC401, Introductory Mandarin Level 1 in UiTM. Students enrolled in the Diploma Mandarin course at UiTM are not the focus of this research.

### 3.3 Research Instruments

In the study, a structured questionnaire with dichotomous questions (Yes or No), multiple-choice questions, and rating scale questions were used. The questions were arranged in certain orders, to allow researchers to delve deeper into what the participants think and to reflect on what may apply based on their responses.

The questionnaire is divided into three sections: demographic sections, theoretical sections, and reading recording sections.

In the demographic sections, participants must complete a brief questionnaire about their language learning background. The theoretical sections contain five questions designed to assess participants' ability to master the theory of tone modification. Finally, for practical components, participants are asked to upload their recordings of the following text:

I. Phrases: nǐ hǎo , hěn hǎo , bù shì , bù yào, yī qǐ , yī gè

II. Sentences : Xīngqī yī , māmā bù xiǎng qù mǎi shuǐguǒ 。

Zhè yī jiàn yīfú hěn hǎo , dànshì bù piányí 。

Two parts of recording requested in order to find out if students are able to produce isolated tones correctly. There are no new words for the participant as target words are selected from the TMC401 text book which has being taught before.

Because of the Covid-19 pandemic, ODL has been performed at UiTM since February 2020. Researchers have no chance, but it is not suggested that they conduct a recording with participants on campus. As a result, the recording must be conducted in a quiet room by the participants themselves. All of the recording will then be transcribed by the researcher using IPA symbols referenced from Wikipedia Common IPA Chart (2005). After that, the data will be divided into three categories: original tone, sandhi tone, and other. If there was a disagreement between the three researchers, they met and listened together before making a final decision.

#### 4. Results

Fu [7] argued that analysing the vocal tone biases of learners of Mandarin, categorising them and analysing their causes may help teachers in teaching Mandarin as a foreign language phonetically.

The data analysis from the audio recording revealed an overall accuracy rate of 39.68 percent tone sandhi productions by the participants as shown in Figure 1. More than half of the participants are unable to correctly pronounce tone sandhi. This is a critical issue that must be addressed.

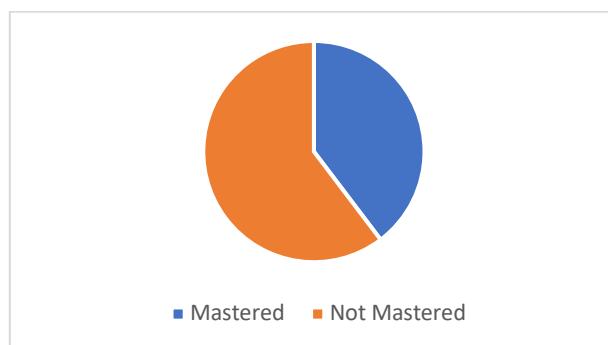


Fig. 1. Students' mastery of tone sandhi

The following comparisons have also been made in order to understand the extent to which learners at different levels know about tone sandhi:

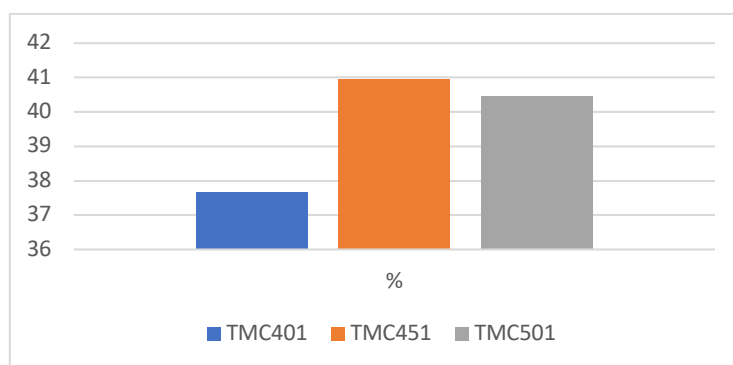
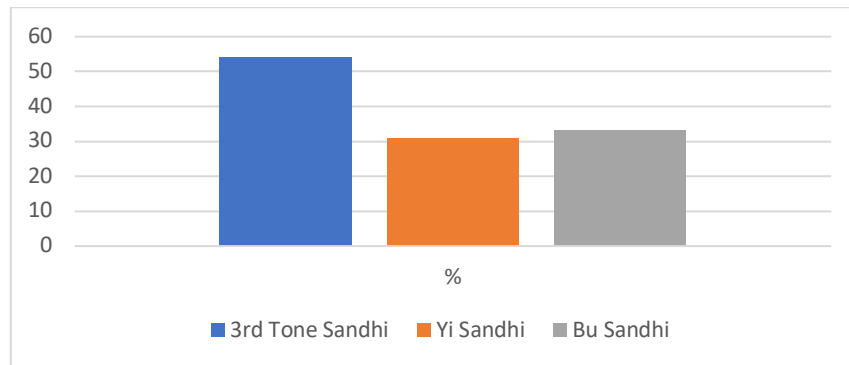


Fig. 2. Mastery of tone sandhi by students at different levels

Based on Figure 2, we can clearly see that TMC451 students (Introductory Mandarin Level 2) have the highest accuracy in tone sandhi pronunciation, followed by TMC501 students (Introductory Mandarin Level 3), and finally TMC401 students (Introductory Mandarin Level 1) who are new to learning Mandarin. This result is unexpected because TMC 501 students are expected to be better in mastering tone sandhi skills due to their longer learning period. The fact that TMC501 accuracy rate is lower than the TMC451 accuracy rate could be attributed to a factor in which learners experienced a bottleneck effect at the upper level.

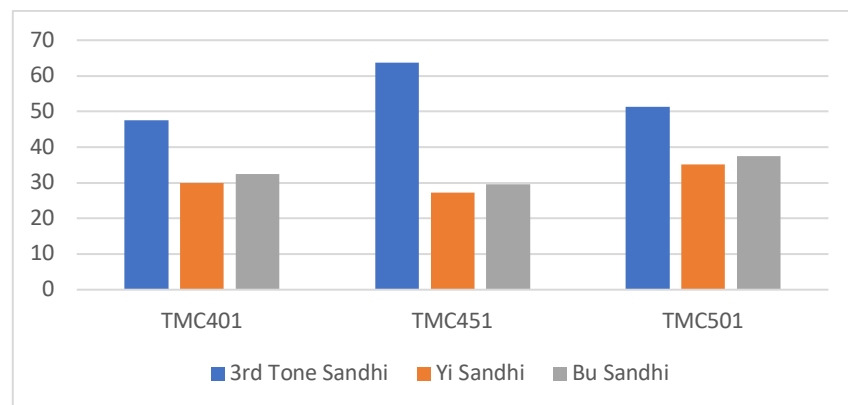
Further examination of the various tone environments yielded the accuracy rates depicted in Figure 3. It has been discovered that students can master the tone sandhi of the third tone much more easily. Approximately 54.17 percent of students can pronounce the tone sandhi of the third tone correctly, this could be due to the lecturer's repeated drilling in the class. The accuracy of Yi sandhi's (30.82 percent) is similar to that of Bu sandhi's (33.18 percent), and both are apparently lower than that of the third-tone sandhi. This is possibly due to the fact that under these tone environments required to memorize the immediate succeeding syllables after Yi or Bu syllables,

whereas the third-tone sandhi occurs only in the situations when two adjacent syllables are third tones.



**Fig. 3.** Students' mastery of different tone sandhi

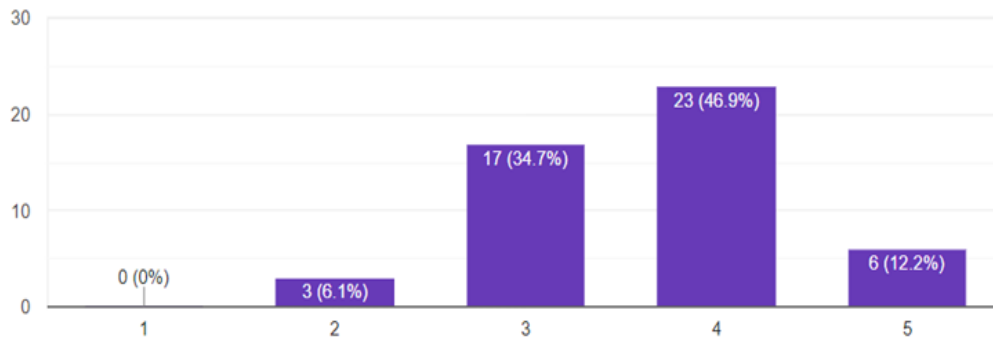
Figure 4 illustrates the details in mastery of different tone sandhi across different Mandarin knowledge level of the students. The TMC401 students can pronounce Yi sandhi and Bu sandhi slightly better than TMC451 students, whereas the students from TMC501 are the best in pronouncing these two tone sandhis. Present study recorded a rather high accuracy in third-tone sandhi by the students taking TMC451, this could be due to the lecturer's repeated drilling of third-tone sandhi, as third tone sandhi occurs the most frequently in the TMC451 textbook. Therefore, we are confident that repeated drilling is an important strategy in tone sandhi teaching.



**Fig. 4.** Different sandhi across different students' level

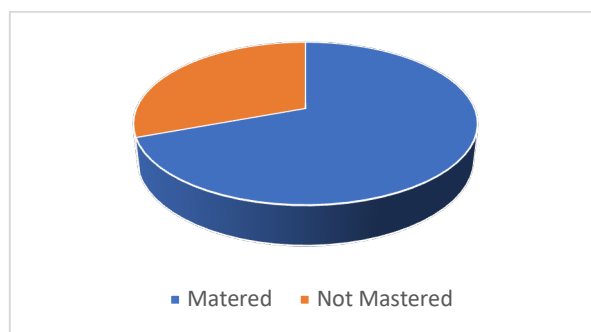
The learning of tone sandhi is a crucial element in Mandarin phonological learning. It is important to maintain a good grasp of phonetics from the start to finish, but the most difficult part is the initial emphasis on the theoretical development. According to our survey results as shown in Figure 5, 34.7 percent of the students claimed to be confident in the theory of tone sandhi, and 46.9 percent of students have mastered the theory of tone sandhi. Six students, or approximately 12.2 percent, indicated that they have a thorough understanding of the tone sandhi theory.





**Fig. 5.** Student Self-assessment Toward Tone Sandhi Theory

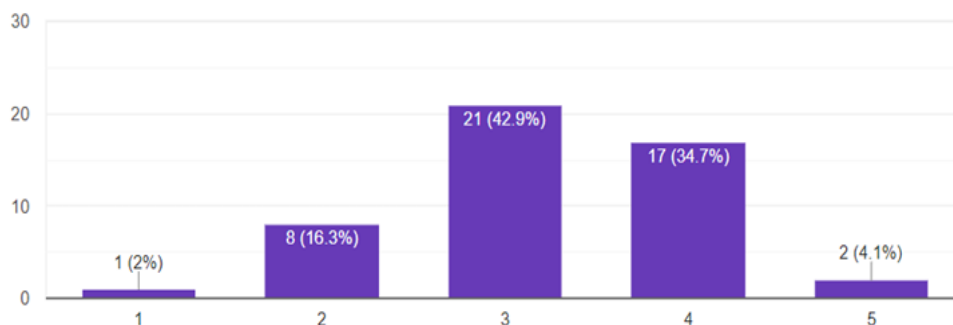
According to our questionnaire, 69.38 percent of students were able to answer basic questions about the rules of tone sandhi, as clearly depicted in Figure 6.



**Fig. 6.** Students' mastery of theory

Most students are clear about the pattern of the third-tone sandhi. The change of tone for “Bu” is only theoretically understood and needs more practical exercise. Students were vague about the tone sandhi of “Yi”. Normally, “Yi” is pronounced in the first tone when it precedes a first tone, second tone or third tone syllable, however, it is read in the second tone when it precedes a fourth tone. The students were unable to choose the correct answers in the questionnaire.

According to Figure 7, concerning the difficulty of tone sandhi, approximately 81.7 percent of students admit that tone sandhi is difficult to master. Only about 18.3 percent of students believe that changing the tone is a simple task.



**Fig. 7.** Difficulty in learning tone sandhi

All of the students participated in the survey agreed that tone sandhi is essential in learning of Mandarin, they also claimed that tone sandhi has raised their interest in Mandarin learning. Furthermore, all of the students also agreed that the existing textbook content should place more emphasis on the study of tone sandhi. In view of these shortcomings, an appropriate standard

teaching method should be developed to improve students' learning and enhance their interest in learning, hopefully will lead to a successful long-term outcome.

## 5. Conclusions

Tone sandhi is a difficult concept to grasp in Mandarin and tone sandhi teaching is unquestionably an important aspect of Mandarin learning. Teachers must boost their awareness in standard-tuning teaching, teach seriously and enthusiastically, and plan their lessons carefully; whereas students must raise their awareness of standard-tuning learning, study hard, and practise frequently. The strategies to improve tone teaching include: focus on students' psychological characteristics, remove learning barriers, use a variety of effective teaching methods, and make bold innovations, through all these practices, mastery of tone sandhi in Mandarin will become a much easier task for students.

According to the results of the study, the accuracy of the students' Mandarin pronunciation was not satisfactory. Therefore, learners' mastery of tone sandhi needs to be enhanced. The most important stage of phonics learning is the elementary stage. Therefore, the effectiveness and results of teaching at the elementary stage determine students' Mandarin phonetic and even language proficiency. If the students do not learn the fundamentals of prosody well during the TMC401 course as the first stage of learning Mandarin, they will encounter greater difficulties when they move on to the next stage of learning.

On the second research question of this study, we found that only half of the students have mastered the theory of tone sandhi. Theory is the foundation, and mastery of theory, combined with practical speaking practice, is what will correct students' pronunciation.

Finally, this study also answers the third research question. Students' perceptions of tone sandhi in Mandarin learning are positive, and if we use appropriate teaching methods and provide learners more opportunities to practice, we can certainly improve their pronunciation.

Learning Mandarin requires long-term perseverance, and learning and practising phonetics is the most crucial building block of language learning. In other words, learning a language requires a good grasp of pronunciation at an early stage, this is because failure in learning phonetics carries over into the learning of grammar and vocabulary, it thus signifies the importance of teaching tone sandhi in the early stages.

### 5.1 Suggestion

#### 5.1.1 Tonal Sandhi noted in textbooks.

When pronounced monotonously, each Chinese character has its own fixed tone, which is represented by the tone mark in Chinese pinyin. Hanyu Pinyin Zhengcifa Jiben Guize (2012) do urged Ordinary textbooks, continue to mark the original tones of Chinese characters with tonal changes. It is recommended that the tone sandhi of Chinese characters be marked in textbooks to help students remember the tone sandhi and read aloud in the correct tone. This helps to increase the input volume of students' learning when they study independently, and it also helps students' reading aloud accuracy.

#### 5.1.2 Mnemonic tone sandhi chant

The mastery of Chinese knowledge has an effect on the learning of tones, but the lengthy theory is definitely an impediment to student learning. Converting theories into catchy chant can quickly increase students' interest in learning. Furthermore, catchy mantras and nursery rhymes can help

them deepen their understanding and memory of technical links in repeated exercises, thereby mobilising their learning enthusiasm and benefiting students' learning.

### 5.1.3 From a shallower to a deeper level of language knowledge teaching

Instead of stultifying students purely with tedious sandhi theory, the teaching of tone sandhi theory must be accompanied with a proper explanation to consolidate the foundation. Elementary learners should concentrate on learning, supplemented by explaining the theory of tone sandhi and providing examples in class; intermediate learners should have the theoretical content of supplementary knowledge reinforced in class by further explaining the concept of tone sandhi and providing appropriate reading exercises; and advanced learners can then be supplemented by explaining the deeper theory of tone sandhi and providing examples for self-learning in class. The only rules for language learning are "step by step," "strengthen repetition," and "spiral improvement." (Mao, 2019)

### 5.1.4 Adaptable teaching method

Teachers should use a variety of teaching methods to demonstrate as many vivid and interesting aspects of Mandarin as possible, psychologically reduce students' inner fear and anxiety when learning intonation, create a relaxed learning environment, reduce students' emotional barriers to learning intonation, and be proactive in carrying out communicative activities and related exercises. Teachers should also encourage students to read aloud in class and show appreciation and recognition when they participate in activities to enhance students' self-esteem.

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