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SYSTEMATIC REVIEW OF MANDARIN PRONUNCIATION LEARNING STRATEGIES

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ABSTRACT

This study utilized a systematic review approach in reviewing previous studies on Mandarin pronunciation learning strategies. Two accessible electronic databases, namely CNKI and Google Scholar were selected as the platform to search all relevant publication. A total of 14 relevant publications were collected and analysed. Findings of this study revealed that majority of MPLS publication are empirical studies covered quantitative and mixed method studies. Population selected in MPLS study involved both learners studied Mandarin in target and non-target environment. This study also indicated that cognitive and metacognitive strategies were perceived as the most frequent used strategies among Mandarin learners, while compensation strategies were the least frequently used strategies. Individual factors were major studied area compared to other factors. Findings showed that the studies on MPLS remain scarce. Hence, to fill the gap, it was highly recommended that more in-depth studies on MPLS needed to be carried out in future.

1. Introduction

Learning pronunciation is essential in learning a second or foreign language. Every stage of language learning includes pronunciation since it is an essential aspect of communicative competence as well as performance (Akyol, 2012). Pronunciation is one of the key components of language proficiency for language learners in securing an understandable pronunciation. Based on the definition provided by Oxford, Language learning strategies (LLS) is a specific action taken by learners to make learning easier, faster, more enjoyable, more self-directed, more efficient, and more transferable to a new situation. Rubin (1975) and Stern (1975) pioneered LLS studies on good language learners. Rubin's (1975) study reported that a good learner has a set of effective learning strategies to achieve their learning goal. Pioneering work that concerning the effective ways of language learning triggers various studies on LLS applied to listening, reading, oral communication, writing and vocabulary (Cohen & Macaro, 2007). Hence, it was believed that LLS has been studied for the past decade.

Pronunciation learning strategies (PLS) is a specific step taken by learners to improve their pronunciation performance (Peterson, 2000). The pioneering work of PLS was carried out by Peterson (2000). In the study reported by Peterson (2000), 12 strategies with 43 tactics were found in learning pronunciation and these strategies were able to fit into the taxonomy LLS proposed by Oxford. Eskstein (2007) has proposed a taxonomy of PLS after Peterson, which included input/practice, noticing/feedback, hypothesis forming/hypothesis testing, strategies/practice strategies, attention and feedback strategies. Based on the pioneered work of Peterson (2000) and Eskstein (2007), few studies have asked students to evaluate their PLS and provide a list of the strategies they employed while learning pronunciation (Wachid, 2021). These studies have also provided evidence for the impact of using PLS. For instance, findings from Wachid's (2021) study revealed that students' performance were improved when they were taught to use compulsion strategy and podcast media. Furthermore, be convinced by the findings, it is undoubtedly a good pronunciation contribute to overall success in learning a language.

Mandarin is a tonal language that consists of four tone which is totally different from non-tonal language such as English, Spanish, Korean, German, French and Malay language. Thus far, Mandarin pronunciation is still perceived as the most difficult and challenging task for Mandarin learners from a non-tonal language learning environment (Ting & Jacqueline, 2018). Additionally, limited hours in the class also prevent language instructor from focusing on phonics teaching. Therefore, to be proficient in Mandarin pronunciation, learners tend to utilize effective PLS. Despite substantial research on MPLS, attentive study reviews were rarely attempted. As a result, this study sought to close the knowledge gap regarding qualities and tendencies of MPLS.

A systematic review study provides more precise direction for the study topic. To further our understanding of MPLS, systematic review also aids in identifying research gaps. Consequently, subsequent studies could observe the authors' research rigour, identify research gaps, and identify study directions through study of the literature. In this work, MPLS study results from previous were analyzed quantitatively and qualitatively using statistical methods to undertake an extensive analysis of key issues. The significance of this systematic review is enabling researchers to comprehend the key issues on MPLS. Moreover, this systematic review is also of great significance to International Chinese Education.

2. Methodology

This study employed a systematic review approach to explore the studies on Mandarin pronunciation learning strategies. Two electronic databases namely China National Knowledge Infrastructure (CNKI) and Google Scholar were selected for this review study. CNKI was used to

retrieve the articles written in Mandarin, while Google Scholar was used to retrieve the articles written in English or Malay language. The keywords “汉语语音学习策略(Hànyǔ yǔyīn xuéxí cèluè)” and keyword “Mandarin/Chinese Pronunciation Learning Strategies” were used to search the relevant articles in both CNKI and Google Scholar. The selection of the articles are based on the following criteria: (1) the subject of the study was limited to students who learned Mandarin as a second or foreign language; (2) the literature was limited to empirical studies on MPLS, thus, review articles, book series, books, book chapters, and conference proceedings were excluded from this systematic review; (3) the article published from the beginning until now. Figure 1 illustrated the procedure of systematic review for this study. 15 sample studies of MPLS were retrieved from CNKI database, however 0 result retrieved from Google Scholar. No related studies were found from Google scholar, it shows that studies on MPLS might not be fully developed. Apart from that, it might also reveal that MPLS studies might not receive sufficient attention from the scholar. Lastly, 14 sample studies meet the criteria after full text assessed. The study focusing on strategy training has been excluded from this review study since the study does not fulfil the search criteria.

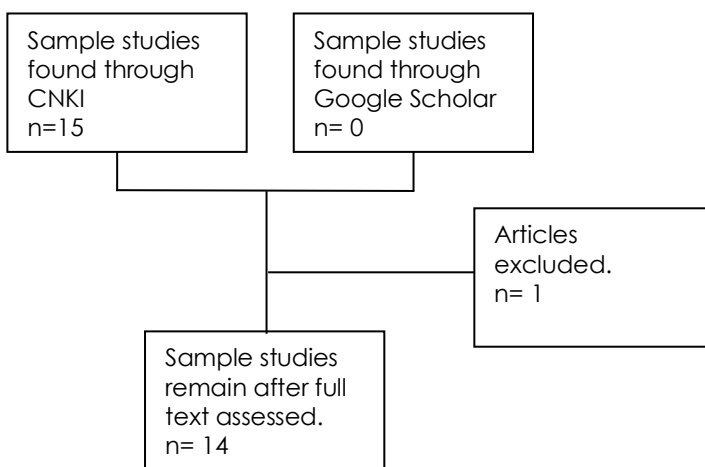


Figure 1. Procedure of systematic review

3. Results

The analysis of this study is reported in this section. The analysis included the number of MPLS studies published by year, research method, major selected population, employment of MPLS among the learners from diverse cultural background, and relevant factors affecting MPLS were presented in following.

Distribution of MPLS articles by year

Figure 2 displays the tendency of published studies on MPLS. The first MPLS studies was carried out in 2008 which took place in Beijing (Liu, 2008). The findings implied that MPLS has drawn attention among the researchers since 2008. As shown in Figure 2, the publication of MPLS shows consistent which at least one publication found each year (excluding 2010, 2013 and 2018).

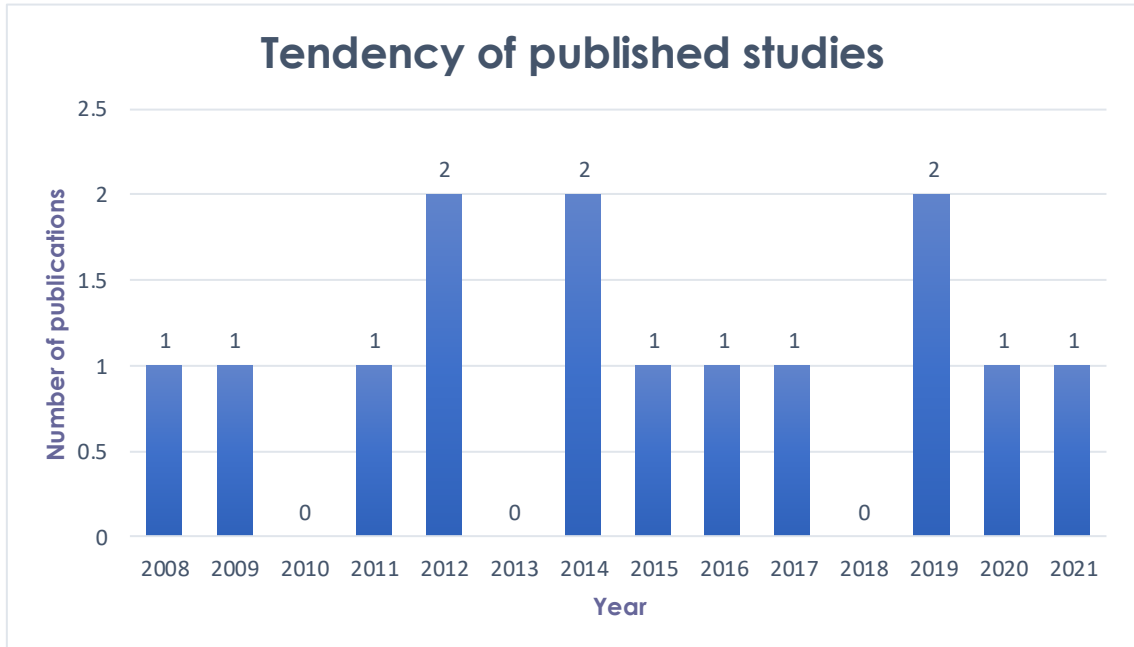


Figure 2. Relevance studies on MPLS published by year

Analysis of research method in the studies of MPLS

Regarding research method, there are only empirical studies concerning MPLS (Figure 3). Most of these empirical studies are quantitative studies with a total of 11 (79%) sample studies, while mixed-method study accumulated 3 (21%) sample studies. Findings of this review indicated that quantitative study in MPLS are more likely to utilized questionnaire as instrument. From the analysis, it was found that questionnaire used in MPLS studies (Zhou, 2021; Zhang, 2019; Cao, 2015) were mostly refer to the Strategy Inventory of Language Learning Strategies (SILL) designed by Oxford (1990) and Pronunciation Learning Strategies (PLS) by Peterson (2000). Most of the researchers mentioned that SILL has been selected because it is the most influential questionnaire with a high reliability and validity, and it was widely used among the researchers to examine learning strategies among learners. Meanwhile, pronunciation learning strategies by Peterson has been selected as a reference in the study of MPLS because it was the most influential questionnaire specifically used to explore learning strategies in learning Mandarin pronunciation.

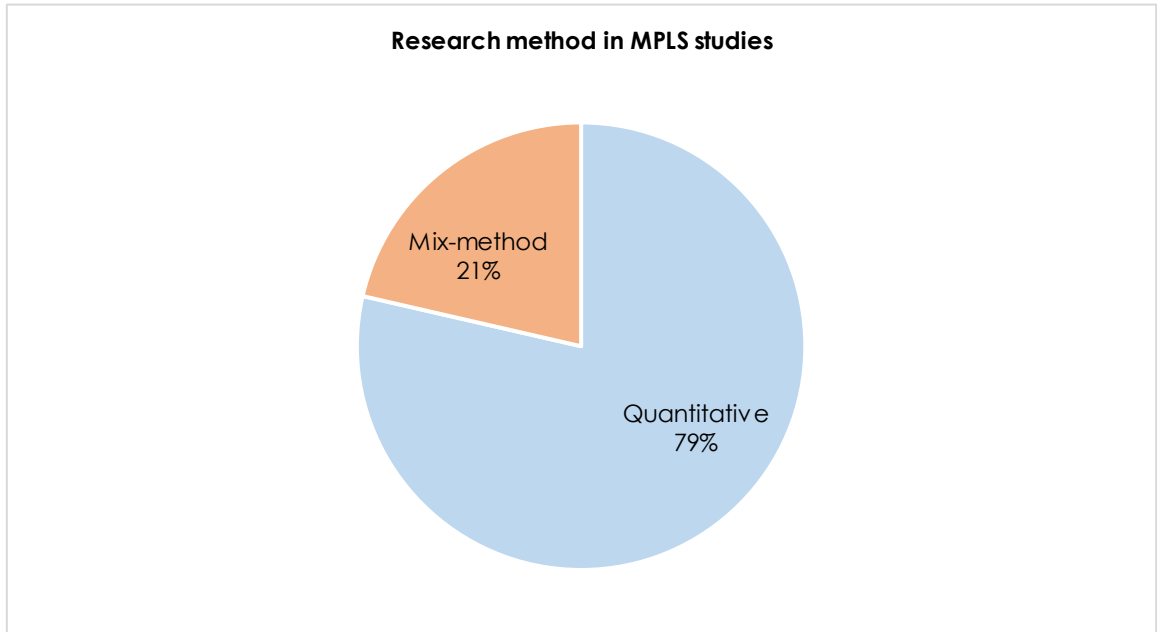


Figure 3. Distribution of research method of previous studies on MPLS

Analysis of major selected population in the studies of MPLS

The major selected population in the studies of MPLS was displayed in Figure 4. Population of MPLS study included learners from target language learning environment and non-target language learning environment. As illustrated in Figure 4, most of the population were those studied Mandarin in non-target environment which accounted 57% of the past studies (Zhou, 2021; Mei, 2019; Jia, 2017; Yi, 2016; Deng, 2014; Wang, 2014; Dong, 2012; Moon, 2012; Li & Yan, 2011). It was found that non-target language environment studied MPLS choices among the Mandarin learners from Peruvian (Zhou, 2012), Kenyan (Mei, 2019), Hungarian (Jia, 2017), Cameroon (Yi, 2016), Chile, (Deng, 2014), Indonesia, (Wang, 2014), British (Dong, 2012), and Korea (Moon, 2012).

On the other hand, a total of 43% of the past studies included Mandarin learners who learned Mandarin in the target environments (Sun, 2020; Zhang, 2019; Cao, 2015; Liu, 2009; Liu, 2008). For example, Sun (2020) took 81 beginner learners of Mandarin at Shanghai International Studies University as respondents to examine the use of MPLS. Furthermore, Liu (2009) selected 49 foreign students at East China Normal University as the subject to explore learners' MPLS choices. It can be noted that the selected foreign students showed diversity in their cultural background. In contrast, 42 Russian learners of Mandarin from Faculty of International Education at Liaoning University that were included in the study of MPLS by Zhang (2019) were from a single cultural background. Apart from that, it was found that MPLS study by Cao (2015) also selected 37 Mandarin learners from the same cultural background as the subject. It was reported in this review study, majority of population involved in MPLS study were Mandarin learners from single cultural background (n= 11).

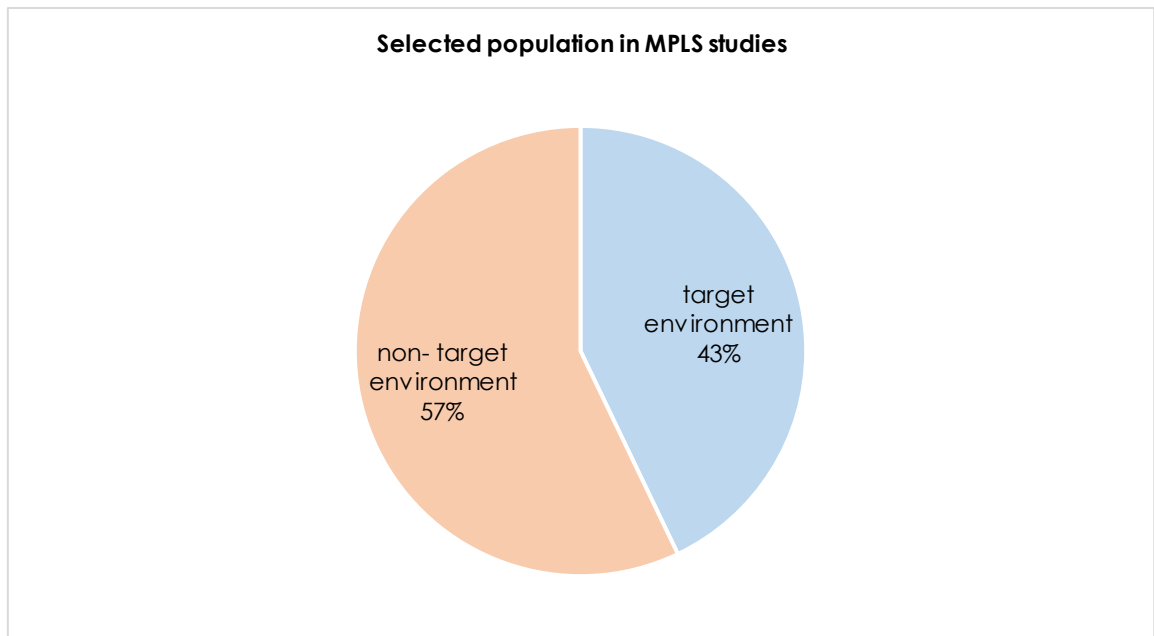


Figure 4. Distribution of population in different language learning context

Analysis of MPLS employment by non-native Mandarin learners in various learning environment

Table 1 depicted the most and least frequently used of MPLS by non-native learners who studied Mandarin in various learning environments. As portrayed in Table 1, cognitive strategies and metacognitive strategies are more often in the top three, therefore both strategies are perceived as the most frequently used strategies. Meanwhile, compensation strategies are the least frequently used strategies among non-native Mandarin learners as compensation strategies are more likely to come last. This finding disclosed that neither learners studied Mandarin in target environment nor non-target environment, their selection of MPLS showed similar. For example, Liu (2009) study on 49 Mandarin learners in China (target environment) found that learners tend to use affective strategies, metacognitive strategies and cognitive strategies while learning Mandarin pronunciation. Furthermore, Mei (2019) study on 128 Mandarin learners in Kenyan (non-target environment) found that memory strategies, cognitive strategies and metacognitive strategies ranked top three among the selection of MPLS. Although Mei's (2019) study showed a slightly different from Liu's (2009) findings, it was undoubtedly learners studying Mandarin in different learning environments were commonly utilizing cognitive and metacognitive strategies in their Mandarin pronunciation learning.

Findings in Table 4 discovered that compensation strategies were found to be the least frequently used strategies among non-native Mandarin learners in both target environment and non-target environment. To compare, majority of the studies portrayed that learner who studied Mandarin in a non-target environment rarely utilized compensation strategies in their pronunciation learning than those studied Mandarin in target environment. There were five studies (Zhou, 2021; Yi, 2017; Deng, 2014; Wang, 2014; Dong, 2012) found that compensation strategies ranked lowest which revealed that learners utilized less compensation strategies in non-target environments.

Nonetheless, there were only three studies (Sun, 2020; Cao, 2015; Liu, 2008) found that compensation strategies are the least strategies utilized by learners studying Mandarin in a target environment.

*Table 1
Overview of MPLS employed by non-native Mandarin learners in various learning environment*

No	Authors	Year	Employment of MPLS (from the most frequent used to least frequent used)	Learning environment
1	Liu	2008	Social strategies, cognitive strategies, metacognitive strategies, memory strategies, compensation strategies	Target
2	Liu	2009	Affective strategies, metacognitive strategies, cognitive strategies, social strategies	Target
3	Li & Yan	2011	Cognitive strategies, compensation strategies, metacognitive strategies, affective strategies, memory strategies, social strategies	Target
4	Moon	2012	Affective strategies, compensation strategies, metacognitive strategies, cognitive strategies, social strategies	Non-target
5	Dong	2012	Cognitive strategies, affective strategies, memory strategies, metacognitive strategies, social strategies, compensation strategies	Non-target
6	Wang	2014	Memory strategies, metacognitive strategies, social strategies, cognitive strategies, compensation strategies	Non-target
7	Deng	2014	Cognitive strategies, affective strategies, social strategies, memory strategies, metacognitive strategies, compensation strategies	Non-target
8	Cao	2015	Affective strategies, cognitive strategies, social strategies, memory strategies, metacognitive strategies, compensation strategies	Target
9	Yi	2016	Cognitive strategies, metacognitive strategies, memory strategies, affective strategies, social strategies, compensation strategies	Non-target
10	Jia	2017	Cognitive strategies, social strategies, memory strategies, metacognitive strategies, compensation strategies, affective strategies	Non-target
11	Zhang	2019	Social strategies, metacognitive strategies, compensation strategies, cognitive strategies, memory strategies, affective strategies	target
12	Mei	2019	Memory strategies, cognitive strategies, metacognitive strategies, social strategies	Non-target
13	Sun	2020	Affective strategies, cognitive strategies, metacognitive strategies, social strategies, memory strategies, compensation strategies	target
14	Zhou	2021	Cognitive strategies, metacognitive strategies, social strategies, affective strategies, memory strategies, compensation strategies	Non-target

Analysis of relevant factors affecting MPLS

Table 2 presents the factors that affecting MPLS among non-native Mandarin learners. Referring to Table 2, majority of the literature emphasised individual factors (gender, age, learning motivation etc) that influenced MPLS. The analysis of factors affecting MPLS revealed that no significant correlations between gender and MPLS (Liu, 2008; Moon, 2012; Deng, 2014; Cao, 2015; Yi, 2016; Jia, 2017; Zhang 2019; Sun, 2020; Zhou, 2021). Nevertheless, the studies (Sun, 2020; Zhang, 2019; Jia, 2017; Cao, 2015; Moon, 2012; Liu, 2008) reported that frequency of MPLS usage among female students is higher as compared to male students. For example, Sun's (2020) study indicated that female students often employed MPLS than male students. From study by Sun (2020), male students are more likely to utilize metacognitive strategies, social strategies, and compensation strategies while learning Mandarin pronunciation, whereas female students often employed memory strategies, cognitive strategies and affective strategies. Contrarily, studies done by Deng (2014) reported that male students are more likely to employ MPLS compared to female students.

Age is one of the personal factors that has been examined in the past studies (Li & Yan, 2011; Deng, 2014; Yi, 2016; Jia, 2017; Sun, 2020). As shown in table 2, a total of 13 past studies reported that age will not influence the utilization of MPLS among non-native Mandarin learners. For example, Li and Yan (2011) surveyed on 101 Mandarin learners from Central Asia indicated that age was not significantly correlated to learning strategy selection. A study by Yi (2016) on 106 Mandarin learners in Cameroon also revealed that there were no significant differences between learners' age and selection of MPLS.

In addition, part of the literature studies in the past explored the correlation between learning motivation and learning strategies selection (Zhou, 2021; Deng, 2014; Liu, 2009). The findings indicated that learning motivation does not affect the learners' selection on learning strategies of Mandarin pronunciation. Nonetheless, a differ findings yielded in the study done by Sun (2020). Findings by Sun (2020) reported that learners who had a strong integrative motivation often used learning strategies than those who are highly motivated towards instrumental motivation.

Background factors (duration of learning Mandarin, proficiency of Mandarin pronunciation, achievement in Mandarin pronunciation and second language experience) which affected MPLS have also been explored in the past studies. The study by Cao (2015) and Jia (2017) demonstrated that second language learning experience does not significantly relate to learners' selection of MPLS. Majority of the literature studies (Zhou, 2021; Sun, 2020; Yi, 2016) revealed that learning duration does not reflect on the MPLS choices among non-native Mandarin learners. In reverse, although Cao's (2015) study also indicated there was no significant correlation between learning duration and MPLS, the strongest difference was seen in the use of metacognitive strategies. In addition, findings of Deng (2014) revealed a significant correlation between learning duration and the use of affective strategies among non-native Mandarin learners in Chile.

Referring to Table 2, it was found that the influence of good and poor Mandarin pronunciation learners on the selection of MPLS was in dispute. Some studies (Sun, 2020; Jia, 2017; Deng, 2014) revealed that there was a significant difference between good-poor Mandarin pronunciation learners and the use of MPLS which indicated that the good learners utilised MPLS more often than poor Mandarin pronunciation learners. For example, Sun's (2020) study that included 81 non-native Mandarin learners who studied Mandarin in China revealed that good Mandarin pronunciation learners used MPLS more often than poor Mandarin pronunciation learners. Sun (2020) further reported that good Mandarin pronunciation learners employed metacognitive

strategies, cognitive strategies, social strategies, and affective strategies frequently. Deng (2014) studied on 67 Mandarin learners from Chile also declared that the frequency of using MPLS among learners with good Mandarin pronunciation was higher than learners with poor Mandarin pronunciation especially in the use of affective strategies and cognitive strategies. On the contrary, Dong (2012) reported that the great significant differences among good and poor Mandarin pronunciation learners are only found in the use of affective strategies and cognitive strategies. Meanwhile, Liu's (2009) study revealed that good and poor Mandarin pronunciation learners only showed significant differences in the use of cognitive strategies, metacognitive strategies, and affective strategies. Furthermore, studies done by Liu (2008), Wang (2014), Yi, (2016), Zhang (2019) and Zhou (2021) indicated that there were no significant differences between good and poor Mandarin pronunciation learners and their selection of MPLS.

The analysis depicted in Table 2 also revealed that learners' achievement on Mandarin pronunciation does not correlate to the selection of MPLS was controversial. Five studies (Zhou, 2021; Zhang, 2019; Moon, 2012; Liu, 2008) found that learners' employment of MPLS does not affect their achievement. Yet, another stream of studies (Cao, 2015; Deng, 2014; Wang, 2014; Dong, 2012) reported that some of MPLS selection have influenced learners' Mandarin pronunciation achievement. For example, Cao (2015) conducted a Pearson correlation analysis on learners' achievement and their selection of MPLS. It was found that p value of metacognitive strategies is 0.013 and less than 0.05 which suggested that there was a significant difference between metacognitive strategies and learners' achievement in Mandarin pronunciation. Additionally, Wang's (2014) findings demonstrated that there was a negative correlation between the use of compensation strategies and learners' achievement ($r = -0.350$, $p = 0.002$) which indicates the utilization of compensation strategies have much effect on learners' Mandarin pronunciation performance. A contrast finding by Sun (2020) illustrated that learners' performance in Mandarin pronunciation is highly correlated to the use of cognitive, metacognitive memory, affective, and social strategies.

From Table 2, it was found that mother tongue or ethnicity of Mandarin learner notably affected the usage of strategy (Sun, 2020; Dong, 2012; Liu, 2009). Liu's (2008) findings were the only studies that revealed learners' mother tongue or ethnicity have no influence their use of MPLS. Furthermore, the analysis shown in Table 2 also illustrated that the proficiency of Mandarin pronunciation was significantly correlated to MPLS selection (Moon, 2012; Li & Yan, 2011; Liu, 2009). In contrast, only Yi's (2016) study found that the level of Mandarin proficiency does not correlate to the selection of MPLS. As shown in Table 2, studies on environmental factors (classroom context, social context, language instructor) influencing the use of learning strategies are rarely scarce. For instance, Liu (2008) mentioned the language instructor does not influence the MPLS choices among non-native Mandarin learners. Liu (2009) pointed out that the learners' selection of MPLS does not affect by language environment.

Table 2
Factors affecting MPLS among non-native Mandarin learners

Authors	Year	Gender	Age	Mother tongue/ Ethnicity	Learning motivation	Level of Mandarin Proficiency	Second language experience	Learning duration	Learning environment	Good learners and poor learners's choices	Achievement
Liu	2008	-		-						-	-
Liu	2009			+	-	+			-	+/-	
Li & Yan	2011		-			+					
Moon	2012	-				+					-
Doning	2012			+						+/-	+/-
Wang	2014									-	+/-
Deng	2014	-	+		-					+	+/-
Cao	2015	-					-	-			+/-
Yi	2016	-	-			-				-	
Jia	2017	-	-				-	-		+	
Zhang	2019	-								-	-
Mei	2019		-								
Sun	2020	+/-		+	+					+	+
Zhou	2021	+			-					-	-

*Negative (-) indicates no significant; positive (+) indicates significant; positive-negative (+/-) indicates partial significant

4. Discussion

By analysing the past studies on MPLS, it was reported that MPLS studies were first published in 2008 which indicates that researchers started paying attention to the pronunciation learning strategies employed by non-native Mandarin learners. Yet, the findings of this review study revealed that the attention of MPLS studies was still insufficient, only a total of 14 sample studies were found from the database. Most of the scholar (Eskstein, 2007; Vitanova & Miller,2002;

Derwing & Rossiter, 2001; Celce-Murcia, 1996) asserted the pronunciation is a vital element in second or foreign language learning, thus it was necessary to carried out additional studies on MPLS as it would be beneficial for language instructor to design more effective learning activities related to Mandarin pronunciation that fit learners' learning strategies.

Thus far, studies on MPLS from 2008-2021 are empirical studies. The major publications of MPLS were quantitative study which accumulated 11 (79%) publications, followed by mixed-method study with 3 (21%) publications. This finding revealed that quantitative study was considered as the new trend in the studies of MPLS. According to Ting (2021), the results were more reliable when the mix-method was used in the study. Hence, it would be better to emphasize a mixed-method approach in the study in order to provide a comprehensive finding in all aspects of MPLS.

From the studies, it showed that populations selected from non-target environments show a slightly higher than population from target environments. Nonetheless, population from non-target environment was limited to Peruvian (Zhou, 2012), Kenyan (Mei, 2019), Hungarian (Jia, 2017), Cameroon (Yi, 2016), Chile, (Deng, 2014), Indonesia, (Wang, 2014), British (Dong, 2012), and Korea (Moon, 2012) which implied that the studies on MPLS does not fully study. Furthermore, MPLS studies conducted in target language learning context mostly selected international students as the subject to examine learners' selection on MPLS. This has led to a diversity of research subjects which allow language instructors to observe the use of learning strategies among Mandarin learners from various countries.

This systematic review study revealed learners with diverse culture backgrounds showed similarity in the selection of MPLS. Majority of learners prefer to utilize cognitive and metacognitive strategies while learning Mandarin pronunciation. Meanwhile, compensation strategies were found to be the least used strategies among learners from various countries. Therefore, it is suggested that Mandarin language instructors can create more activities that are related to cognitive and metacognitive strategies.

Findings in this systematic review study implies that individual factors including gender, age, learning motivation are the major studied scope in MPLS studies. According to Zhang (2008), individual differences are the major factor that cannot be ignored in second language acquisition. Zhang (2008) claimed that studies on individual differences provide an important guideline for language instructors to design more effective classroom activities and thus improve learners' acquisition in second language learning. In addition, several scholars (Dornyei, 2005; Ellis, 1999) also declared that individual differences may impact on ultimate attainment of second or foreign language acquisition. Thus, it is important to explore the issue of individual differences in the process of second language learning acquisition. Additionally, other factors as well as classroom and social factors cannot be ignored as the variation in teaching and learning context might impact on the choice of language learning strategies. However, the findings from this review study found that classroom and social context received least attention from the researchers. Therefore, it is suggested that more studies need to be carried out in order to provide guidelines for language instructors to adopt a teaching approach that could cultivate learners' interest in their learning and improve their learning performance.

5. Conclusion and Recommendations

In general, this systematic review study was carried out with the aim to review the past studies on MPLS. From the results of findings, it was reported that all the published work on MPLS are empirical studies (n= 14). In addition, quantitative and mixed methods are the research methods that were employed in the past studies of MPLS. Regarding the research method,

majority of the MPLS studies utilized quantitative study. Selected respondents in the studies of MPLS covered both learners in target and non-target environments. On the other hand, most of the selected respondents from non-target environments are Mandarin learners with a diverse cultural background. Furthermore, the findings of this review study disclosed that Mandarin learners with a single cultural background were considered as a new trend in MPLS studies since these group of learners were mostly selected by researchers. Based on the analysis of factors affected MPLS selection, researchers mostly pay attention to individual factors, specifically gender, age, and learning motivation.

This study revealed a clear theoretical gap in earlier studies on MPLS. Thus, it is suggested that the content of MPLS could be more comprehensive and there was still much potential for further research in MPLS. To receive more reliable findings, it was recommended that a mixed-method approach should be upraised. As mentioned in the findings of this study, Mandarin learners with a single cultural background were a major population in MPLS studies. Hence, future researchers can expand their subjects to cover Mandarin learners with diverse cultural backgrounds for the reason to understand better the MPLS choices among Mandarin learners from various countries. Effective learning strategies have a great impact on learners' academic performance, save a great deal of time and energy. Therefore, it was highly recommended that affecting factors, specifically classroom and social context, needed to be included in future studies of MPLS in which the gaps are indicated in order to modify teaching approach.

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