

***Liushu*-based Instruction and Its Effects on the Motivation and Intended Learning Efforts: The Case of Laos Learners of Standard Chinese**

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Abstract

This study examines the effects of *Liushu*-based instruction on the motivation and intended learning efforts. Beginners of Standard Chinese from Laos were assigned to the experiment group and the control group. The *Liushu*-based instruction in the experiment group was carried on for ten weeks. It was found that *Liushu*-based instruction has a positive effect on learners' motivation, especially for Standard Chinese learners' Ideal L2 Self and L2 learning experience. In addition, Ideal L2 Self showed a mediation effect between *Liushu*-based instruction and intended learning efforts. The article also provides several suggestions for the use of *Liushu* in Chinese character teaching.

Keywords: *Liushu*-based Instruction, Standard Chinese learners, motivation, intended learning efforts

Povzetek

Članek preučuje učinke poučevanja po metodi *Liushu* na motivacijo in načrtovana učna prizadevanja. Učenci začetniki standardne kitajščine iz Laosa so bili uvrščeni v poskusno in kontrolno skupino. Poskusna skupina je navodila po metodi *Liushu* izvajala deset tednov. Ugotovljeno je bilo, da ima poučevanje po metodi *Liushu* pozitiven učinek na motivacijo učencev, zlasti za učencem standardne kitajščine Idealnega L2 sebe ter za L2 učne izkušnje. Poleg tega je Idealni L2 jaz izkazal posredniški učinek med navodili, ki temeljijo na metodi *Liushu*, in načrtovanimi učnimi napori. V članku je na koncu podanih tudi nekaj predlogov za uporabo metode *Liushu* pri poučevanju kitajskih pismenk.

Ključne besede: poučevanje po metodi *Liushu*, učenci standardne kitajščine, motivacija, predvidena prizadevanja za učenje



1 Introduction

Recently, more and more people in Laos choose to learn languages for a variety of purposes and needs. As a result of the Belt and Road initiative, China and Laos have developed greater economic cooperation, which has stimulated the Laos labor market. Accordingly, Standard Chinese as a second language is becoming increasingly popular in Laos due to the demand for Standard Chinese professionals (Tao, Lin & Zhang, 2020).

For many learners, Chinese character learning is a key factor affecting their progress, efficiency, and level. The success or failure of Standard Chinese learning largely depends on the success or failure of Chinese character learning (Li, 2009). However, Ye (2013) stated that the influence of the mother tongue makes it difficult for Standard Chinese learners to learn Chinese characters. A high number of homophones confuse Standard Chinese learners due to the complicated relationship between sound, form, and meaning of the characters. Chen (2020) also indicated that Standard Chinese learners from Laos had difficulty writing Chinese characters since the Chinese language, a logographic writing system, is different from Lao script, which belongs to the alphabetic writing system.

In the Han dynasty of Ancient China, scholars summarized six types of Chinese characters as *Liushu*. The work *Shuo Wen Jie Zi Xu* (说文解字·叙) describes the six types of Chinese characters, which are pictographs (*xiangxingzi* 象形字), ideographs (*zhishizi* 指事字), ideological compounds (*huiyizi* 会意字), semantic-phonetic compounds (*xingshengzi* 形声字), mutually explaining characters (*zhuanzhuzi* 转注字), and phonetic loan characters (*jiajiezi* 假借字). *Liushu* illustrates the association between Chinese characters' glyphs and their meaning (Chen & Fu, 2014). Therefore, *Liushu*-based instruction is recognized as an effective way of Chinese character learning, especially, for the recognition of the sound and meaning of Chinese characters. For example, students can identify the meaning and sound of semantic-phonetic compounds by the meaning element and the sound element. A detailed example is stated as follows: the meaning of *hú* 湖 'lake' is related to its meaning element *sān diǎn shuǐ* 三点水 'water-related', which means water, and the pronunciation of *hú* 湖 'lake' is similar to its sound element *hú* 胡 '(surname) Hu'.

Studies have shown that *Liushu*-based instruction can improve Chinese character achievement (e.g. Qi, 2017, Qiao, 2011, Su & Li, 2019). Liu (2011) also proposed that *Liushu*-based instruction can strengthen Standard Chinese learners' learning motivation. Motivation, which is the effort learners put into the learning of a second language (L2) due to the need or desire to do so (Ellis, 1994, p. 509), plays an influential role in second language acquisition (SLA) (Dörnyei, 2005). However, few studies examine the impact of *Liushu*-based instruction on learners' motivation.

The importance of motivation prompted the development of various models, constructs, and systems. Recently, Dörnyei's (2009) work on the L2 Motivational Self

System (L2MSS) attracted the attention of researchers, in which learners' motivation can be further divided into their Ideal L2 Self (IL2S), Ought-to L2 Self (OL2S), and L2 Learning Experience (L2LE). Based on this system, researchers have investigated the relationship between the three L2MSS components and learner's Intended Learning Efforts (ILEs). In English, learning positive associations between L2MSS components and ILEs have been reported (i.e., in Alshahrani, 2016; Ryan, 2009). Therefore, in this study, the researcher seeks to bridge the gap with an analysis of the relationships between *Liushu*-based instruction, L2MSS components, and ILEs among Standard Chinese learners.

2 Literature review

2.1 *Liushu*-based instruction

Liushu contains six rules summed up by the ancients analyzing the method of making Chinese characters (Chen, 1982). According to *Liushu*, Chinese characters were divided into pictographs, ideographs, ideological compounds, semantic-phonetic compounds, mutually explaining characters, and phonetic loan characters. 1) Pictographs depict specific objects like pictures, such as *rì* 日 'sun'; 2) Ideographs represent abstract ideas. For example, *shàng* 上 'up' and *xià* 下 'down' are marked with symbols above or below the main line to indicate up and down, respectively; 3) ideological compounds combine the meanings represented by the components to create a new meaning. For example, three *rén* 人 'person' make up the *zhòng* 众 'people'; 4) Semantic-phonetic compounds are created by combining a semantic part related to the character's meaning and a phonetic part related to the character's pronunciation. For example, *sān diǎn shuǐ* 氵 'water-related' means water which is the semantic part of *hú* 湖 'lake', and the pronunciation of the phonetic part *hú* 胡 '(a surname) Hu' is the same as the pronunciation of *hú* 湖 'lake'; 5) Mutually explanatory characters refer to the mutual conversion between synonyms with the same radical. For example, both *kǎo* 考 '(the original meaning) elder' and *lǎo* 老 'elder' mean elder in ancient Chinese. However, the meaning and usage of *kǎo* 考 have all been transferred to *lǎo* 老 in modern Chinese, while the modern Chinese character *kǎo* 考 has lost its original meaning; 6) Phonetic loan characters mean that there is no such Chinese character, but for expression, the existing Chinese character is borrowed to serve as the new meaning without creating a new Chinese character. For example, *lìng* 令 'official' of *xiànlìng* 县令 'magistrate' is used to represent the meaning of *lìng* 令 'order' as in *mìnglìng* 命令 'order'.

Xu (2009) proposed that applying *Liushu* to Chinese character teaching can form three specific teaching methods: image display, character configuration analysis, and systematic induction. a. The method of image display is primarily employed for pictographs. By communicating the relationship between the image and the text, the vivid image can help students understand Chinese characters' meaning in connection

with real-life; b. Character configuration analysis is mainly used for ideographs and ideological compounds. Like storytelling, this method combines vivid life scenes with Chinese characters; c. A method of system induction is commonly used for semantic-phonetic compounds. For example, teachers can introduce characters *zhāng* 彰 ‘evident’ (evident), *zhāng* 漳 ‘(proper name) Zhang’, *zhāng* 樟 ‘camphor’, *zhāng* 蟑 ‘(part of the word) cockroach’, *zhāng* 璋 ‘ancient stone ornament’, *zhàng* 嶂 ‘cliff’, *zhàng* 障 ‘to block’, or *zhàng* 瘴 ‘malaria’ through *zhāng* 章 ‘chapter’. This method can help learners better master the sounds of Chinese characters and their meanings systematically.

However, there have been a lot of changes in the graphical forms of Chinese characters (including the simplification of characters), resulting in a different perception of Chinese characters based on *Liushu*. Li (2012) proposed that the main value of *Liushu* does not lie in theory but in the application. In other words, *Liushu* should serve teaching rather than bringing it a burden. For example, in the teaching of the Chinese character *yào* 药 (藥) ‘medicine’, it is important to let students know what the components of *yào* 药 are (i.e., *cǎo* 艹 ‘grass’ and *yuē* 约 ‘to make an appointment’ and the functions that these components have (i.e., *cǎo* 艹 ‘grass’ is the semantic part, whereas *yuē* 约 is the phonetic part, instead of making students distinguish *yuē* 约 ‘to make an appointment’ and *yuè/lè* 樂 ‘music/happy’. Another example is the semantic-phonetic compound *tīng* 听 (聽) ‘to hear’. According to the interpretation of *Handian* 漢典, the traditional character *tīng* 聽 is made of the semantic part *ěr* 耳 ‘ear’ and *dé* 德 ‘virtue’ and the phonetic part *tǐng* 壬, while the simplified character *tīng* 听 ‘to hear’ is composed of the semantic part *kǒu* 口 ‘mouth’ and the phonetic part *jīn* 斤 ‘catty’. It would be more feasible to use simplified characters to explain the composition of Chinese characters for Standard Chinese learners since simplified characters are the main focus of their learning.

As Qiao (2011) stated, analyzing all Chinese characters in their traditional form would undoubtedly make the situation more complex. However, some simplified characters lose their ideographic function. For example, we can identify the part inside of *guó* 国 (國) ‘country’ as *huò* 或 ‘(originally meaning) country’ only through traditional character. Therefore, in the teaching process, teachers can use traditional characters as an auxiliary means to teach Chinese characters to make it easier for students to understand the meaning and structure of simplified characters. That is, using the close relationship between simplified characters and traditional characters to reasonably explain simplified characters. In addition, some Chinese characters have added or subtracted meanings to suit the use of the language, leading to mutually explanatory characters and phonetic loan characters as stated above. It is worth noting that mutually explanatory characters and phonetic loans are commonly found in ancient texts (e.g. *kǎo* 考 means ‘older’ in ancient texts), and they are not recommended for assisting Chinese character teaching (Chen & Fu, 2014). Therefore, this study does not involve mutually explanatory characters and phonetic loan characters.

2.2 L2 Motivational Self System (L2MSS)

L2 Motivational Self System (L2MSS) was developed by Dörnyei (2005, 2009), and mainly consists of the following three components: IL2S, OL2S, and L2LE. IL2S, which is correlated with integrativeness, represents what students wish to be. OL2S indicates what others expect the student to achieve, which means that it reflects the expectations of others, including their parents and peers. It represents an external motivation, which is related to instrumental motivation. Besides, L2LE is one's experience in a learning environment that is primarily influenced by teachers, courses, and classmates. It is mainly reflected in learners' evaluation of textbooks, teachers, peers, and class. It is worth noting that in Dörnyei's model, it is most common to discuss the relationship between the L2MSS components and ILEs. ILEs refer to the effort that learners make toward a goal, as stated by Moskovsky et al. (2016). For example, learners show a willingness to spend more time and energy on a certain course.

Although many studies have been conducted to examine the relationship between Standard Chinese learners' motivation and ILEs, the results are miscellaneous. Dörnyei & Chan (2013) explored the relationship between self-guides (i.e., IL2S and OL2S) and ILEs in Standard Chinese learning among Standard Chinese learners from Hong Kong. The correlation coefficient showed that the IL2S (in English and Standard Chinese learning) had a positive effect on ILEs ($p < 0.001$). Also based on Dörnyei's L2MSS, the structural model results revealed that both IL2S and OL2S can better predict learners' motivational behavior and the two self-guides together explain 62% of the significant difference in motivational behavior in Wong (2018). Li and Zhang (2021) used multiple regression analysis to examine the predictive ability of IL2S, OL2S, and L2LE on ILEs. The results show that the main components (IL2S, OL2S, and L2LE) of L2MSS can directly or indirectly predict ILEs ($R^2 = 0.55$). Among them, IL2S, directly or indirectly, is the strongest predictor ($\beta = 0.44$) with L2LE as a mediator. In general, the three components of L2MSS have a strong predictive effect on ILEs.

Standard Chinese learning is recently gaining popularity in the countries of Southeast Asia. In Laos, for example, since the early 21st century, Standard Chinese learning has gradually emerged as an important part of higher education with the support of the Confucius Institute Headquarters (Zhang, Lu, & Zhejing, 2021). However, little research was conducted on the subject of Standard Chinese teaching and learning in Laos (Tao, Lin, & Zhang, 2020). Therefore, to fill the gap, this current study intends to bridge the gap with an experiment on *Liushu*-based instruction in Chinese character teaching and provide a more comprehensive picture of *Liushu*-based instruction, three components of L2MSS, and ILEs. Accordingly, this study aims to find answers to the following questions:

1. Is there any difference in the motivation between the control group and the experimental group in the pre-test?
2. Is there any difference in ILEs between the control group and the experimental group in the pre-test?
3. Is there any difference in the motivation of the control group between the pre-test and post-test?
4. Is there any difference in ILEs of the control group between the pre-test and post-test?
5. Is there any difference in the motivation of the experimental group between the pre-test and post-test?
6. Is there any difference in ILEs of the experimental group between the pre-test and post-test?
7. Is there any difference in motivation between the control group and the experimental group in the post-test?
8. Is there any difference in ILEs between the control group and the experimental group in the post-test?
9. Do L2MSS components act as mediators in the relationship between *Liushu*-based instruction and ILEs?

Then, nine null hypotheses were developed based on the research questions.

1. H_{01} : There is no significant difference in the motivation between the control group and the experimental group in the pre-test.
2. H_{02} : There is no significant difference in ILEs between the control group and the experimental group in the pre-test.
3. H_{03} : There is no significant difference in the motivation of the control group between the pre-test and post-test.
4. H_{04} : There is no significant difference in ILEs of the control group between the pre-test and post-test.
5. H_{05} : There is no significant difference in the motivation of the experimental group between the pre-test and post-test.
6. H_{06} : There is no significant difference in ILEs of the experimental group between the pre-test and post-test.
7. H_{07} : There is no significant difference in the motivation between the control group and the experimental group in the post-test.
8. H_{08} : There is no significant difference in ILEs between the control group and the experimental group in the post-test.
9. H_{09} : L2MSS components do not act as mediators in the relationship between *Liushu*-based instruction and ILEs.

3 Methodology

3.1 Research design

The study was a quasi-experimental study using the pre-test and post-test of control and experiment groups. The quasi-experimental design refers to a planned study, including a series of intentional changes to process elements and observations of the effects (Chua, 2016). The experiment involved six classes (two Accounting classes and four Information Technology classes). Human intervention was conducted to ensure homogeneity between both groups. As a result, each group was composed of Accounting students and Information Technology (IT) students.

3.2 Participants

There are a total of 217 Standard Chinese learners majoring in Accounting and IT at H College in Laos. These 217 students are assigned to nine classes with 10-30 students in each class. 47 students (18 males, 29 females) majoring in Accounting were assigned to three classes, and 170 students (105 males, 65 females) majoring in IT were grouped into six classes. Even though Standard Chinese was a mandatory course for them, most Standard Chinese students are beginners.

Six classes with two Accounting classes and four IT classes were selected for this experiment. The final sample size was 133 students, with 68 (37 males, 31 females) in this experiment and 65 (42 males, 23 females) in the control group. 31 of the participants were majoring in Accounting, and 102 were majoring in IT.

3.3 Instruments of study

L2 Motivational Self System Questionnaire (L2MSSQ) was utilized during the data collection process. The L2MSSQ used in this study is a five-point Likert scale adapted from Moskovsky et al. (2016) and Taguchi et al. (2009) to measure the motivation for SLA. The questionnaire also contains two parts. Part one consists of demography and part two consists of 41 items designed to measure learners' IL2S, OL2S, L2LE, and ILEs.

3.4 Validity and reliability of the instrument

In order to check the validity related to the face and the content of the instrument in this study, the questionnaire was handed over to three experts for review. Some modifications were made to adapt to the Standard Chinese learners in this study. For example, according to the experts' suggestions, the items with similar meanings in the questionnaire were also deleted.

To check the reliability of the instrument, the questionnaire was distributed to 39 respondents not participating in the experiment. Results showed the overall Cronbach coefficient for the L2MSSQ was 0.895. Each of its three components, IL2S, OL2S, and L2LE, had Cronbach coefficients of 0.833, 0.817, and 0.750, respectively. Besides, ILEs had a Cronbach coefficient of 0.772. It can be seen Cronbach's alpha values for all subscales are higher than the lowest acceptable value of 0.60 (Pallant, 2010), indicating that the questionnaire has achieved internal consistency.

Finally, in the questionnaire, a demographic survey and a five-point Likert scale are provided. The items in a demographic survey are matric number, gender, age, major, class, length of learning Standard Chinese, and level of Standard Chinese. The items in a five-point Likert scale are IL2S (9 items), OL2S (9 items), L2LE (15 items), and ILEs (8 items).

3.5 Intervention procedure

The experiment was carried out for 10 weeks. The experiment group underwent 10 sessions held once a week. Each session lasted 90 minutes and a total of 20-30 minutes per session was allocated to teaching Chinese characters. Throughout the experiment process, 10 lessons from the course book were taught to both groups. Each of these lessons contained 2-4 Chinese characters for learning. The main purpose was to help learners learn Chinese characters by using the *Liushu*-based instruction. Therefore, the criteria for selecting Chinese characters were 1) Chinese characters planned for the next ten weeks according to the syllabus; 2) Chinese characters that can be used as content words since it is more difficult to explain the Chinese characters' meaning using *Liushu* if it is a function word. For example, *māo* 猫 'cat' was chosen instead of the *le* 了 'a modal particle'. As a result, the topics and Chinese characters of each lesson were set as follows:

1. 九月去北京旅游最好
Jiǔyuè qù Běijīng lǚyóu zuì hǎo
'September is the best time to visit Beijing'
characters: *māo* 猫, *tā* 它, *yào* 要, *zuì* 最
2. 我每天六点起床
Wǒ měitiān liù diǎn qǐchuáng
'I get up at six every day'
characters: *gāo* 高, *máng* 忙, *yào* 药, *shàng* 上
3. 左边那个红色的是我的
Zuǒbiān nàgè hóngsè de shì wǒde
'The red one on the left is mine'
characters: *xià* 下, *hóng* 红, *sòng* 送

4. 这个工作是他帮我介绍的
Zhègè gōngzuò shì tā bāng wǒ jièshào de
 'He recommended me for this job'
 characters: *gěi* 给, *wèn* 问, *cháng* 长, *liǎng* 两
5. 就买这件吧
Jiù mǎi zhèjiàn ba
 'Take this one'
 characters: *yú* 鱼, *yī* 衣, *mǎi* 买, *mài* 卖
6. 你怎么不吃了
Nǐ zěnmē bù chī le
 'Why don't you eat more'
 characters: *mén* 门, *wài* 外, *yáng* 羊
7. 让我想想再告诉你
Ràng wǒ xiǎng xiǎng zài gàosù nǐ
 'Let me think about it and I'll tell you later'
 characters: *děng* 等, *bái* 白, *hēi* 黑, *guì* 贵
8. 题太多, 我没做完
Tí tài duō, wǒ méi zuòwán
 'There are too many questions, I did not finish all of them'
 characters: *cuò* 错, *cóng* 从, *dǒng* 懂, *wán* 完
9. 你穿得太少了
Nǐ chuān de tài shǎo le
 'You wear too little'
 characters: *xuě* 雪, *jìn* 近, *jìn* 进, *chuān* 穿
10. 你看过那个电影吗
Nǐ kànguò nàgè diànyǐng ma
 'Have you seen that movie'
 characters: *wán* 玩, *qíng* 晴

The researcher drafted Chinese character teaching plans to assist the instructor in teaching Chinese characters. The procedures of the lesson were simple routine. The participants in the control group were not given any form of instruction. However, in the experiment group, the teaching steps of each Chinese character included an introduction, reading, writing, character shape evolution or Chinese character structure analysis, and sentence making.

During the introduction phase, students were asked to think of Chinese characters related to the picture (for example, a picture of a fish). With pictographs and ideographs, the teacher encouraged students to discover the similarities between Chinese characters and things.

The instructor would then lead the students to read Chinese characters by practicing the pronunciation of initials and finals. In the case of semantic-phonetic compounds, the teacher instructed students on how to pronounce the sound elements.

Following that, students were given an animated presentation of the writing sequence and then practiced writing Chinese characters, an important step also for the control group.

The next step involved pictographs and ideographs. Students learned the development and evolution of Chinese characters by looking at the changes in the form of Chinese characters from ancient times to the present. They learned the construction principles of ideological compounds and semantic-phonetic compounds by splitting the components (meaning elements and sound elements) of Chinese characters.

The final step was also a routine step in the control group. In it, students used the Chinese characters that they have learned to make sentences based on pictures and other prompts.

3.6 Data analysis

The data were processed and analyzed with SPSS. To answer the questions posed by this study, independent sample *t*-tests were utilized, along with paired sample *t*-tests, to examine any differences in learners' L2MSS and ILEs before and after the experiment. Regression analyses were conducted to examine the mediating effect of L2MSS Components between *Liushu*-based instruction and ILEs.

4 Findings

An independent sample *t*-test was conducted to examine the existence of a statistically significant difference in motivation and ILEs between the control group and the experiment group in the pre-test. The *t*-test results are displayed in Table 1 and Table 2.

Table 1: The control and experimental group's motivation in the pre-test

	Control		Experiment		<i>t</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
IL2S	30.95	5.95	29.32	5.30	1.671	0.097
OL2S	30.32	6.03	31.03	6.16	-0.668	0.505
L2LE	46.35	5.20	46.72	6.71	-0.351	0.726
Overall	107.63	13.52	107.07	15.87	0.218	0.828

IL2S: Ideal L2 Self; OL2S: Ought-to L2 Self; L2LE: L2 Learning Experience

Table 2: The control and experimental group's ILEs in the pre-test

	Control		Experiment		<i>t</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
ILEs	28.20	4.43	27.76	5.43	0.505	0.614

ILEs: Intended Learning Efforts

Table 1 indicates that there is no significant difference in motivation ($t=0.218$; $p=0.828$) between the control group ($M=107.63$, $SD=13.52$) and experiment group ($M=107.07$, $SD=15.87$). Therefore, it was determined that the two groups were identical and H_{01} was accepted.

In terms of IL2S, the mean score of the control group ($M=30.95$, $SD=5.95$) is slightly higher than that of the experimental group ($M=29.32$, $SD=5.30$). This indicates that the control group has a stronger Ideal L2 Self. Becoming an ideal speaker of Standard Chinese is the main source of motivation for the control group.

For OL2S and L2LE, the mean scores ($M=30.32$, $SD=6.03$) and ($M=46.35$, $SD=5.20$) of the control group are slightly lower than those of the experimental group with ($M=31.03$, $SD=6.16$) and ($M=46.72$, $SD=6.71$). In other words, expectations from parents and peers have become a strong motivation for the experimental group to learn Standard Chinese. At the same time, the progress of the experimental group with the current learning experience is more satisfying.

Table 2 shows that there is no significant difference in ILEs ($t= 0.505$; $p=0.614$) between the control group ($M=28.20$, $SD=4.43$) and experiment group ($M=27.76$, $SD=5.43$). Therefore, H_{02} was accepted.

After a 10-week experiment, a paired t -test was conducted in the control group and the experiment group to examine the changes in motivation and ILEs.

Table 3: Motivation of the control group in the pre-test and post-test

	Pre-test		Post-test		<i>t</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
IL2S	30.95	5.95	30.65	5.35	0.469	0.640
OL2S	30.32	6.03	29.54	5.87	1.082	0.283
L2LE	46.35	5.20	47.62	7.74	-1.217	0.228
Motivation	107.63	13.52	107.80	17.01	-0.086	0.932

Table 4: ILEs of the control group in the pre-test and the post-test

	Pre-test		Post-test		<i>t</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
ILEs	28.20	4.43	27.98	5.09	0.22	0.379

As shown in Table 3 and Table 4, no significant differences occurred in motivation ($t=-0.086$, $p=0.932$) and ILEs ($t=0.22$, $p=0.379$) in the control group, which indicates that the conventional teaching method did not produce significant positive or negative changes in learners' motivation and ILEs. Thus, H_{02} and H_{04} were accepted.

Table 5: Motivation of the experiment group in the pre-test and post-test

	Pre-test		Post test		<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
IL2S	29.32	5.30	31.12	6.73	-2.502	0.015*	0.303
OL2S	31.03	6.16	30.41	5.71	0.775	0.441	
L2LE	46.72	6.71	49.06	8.22	-2.233	0.029*	0.271
Motivation	107.07	15.87	110.59	17.94	-1.593	0.116	

*. Significant at level 0.05

Table 6: ILEs of the experiment group in the pre-test and post-test

	Pre-test		Post test		<i>t</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
ILEs	27.76	5.43	28.03	5.24	-0.373	0.710

According to Table 5, there is a statistically significant difference between the pre-test ($M=29.32$, $SD=5.30$) and the post-test ($M=31.12$, $SD=6.73$) of experiment group students in IL2S at $t= -2.502$, $p=0.015$, Cohen's $d= 0.303$, and between pre-test ($M=46.72$, $SD=6.71$) and post-test ($M=49.06$, $SD=8.22$) in L2LE at $t= -2.233$, $p=0.029$, Cohen's $d= 0.271$. This result shows that there are positive changes in learners' IL2S and L2LE in the experiment group who learn Chinese characters by using *Liushu*-based instruction. However, there is no significant difference between the pre-test ($M=27.76$, $SD=5.43$) and the post-test ($M=28.03$, $SD=5.24$) of experiment group learners in ILEs. Therefore, H_{05} was rejected and H_{06} was accepted.

Table 7: Motivation of the control and the experimental group in the post-test

	Control		Experiment		<i>t</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
IL2S	30.65	5.35	31.12	6.73	-0.446	0.656
OL2S	29.54	5.87	30.41	5.71	-0.870	0.386
L2LE	47.62	7.74	49.06	8.22	-1.042	0.299
Motivation	107.80	17.01	110.59	17.94	-0.919	0.360

Table 8: ILEs of the control and the experimental group in the post-test

	Control		Experiment		<i>t</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
ILEs	27.98	5.09	28.03	5.24	-0.050	0.960

As shown in Table 7, there is no significant difference in motivation after the experiment between the control group ($M=107.80$, $SD=17.01$) and the experiment group ($M=110.59$, $SD=17.94$) at $t=-0.919$, $p=0.360$. As far as the three components of motivation are concerned, the scores of the experimental group are generally higher than those of the control group, but there is no significant statistical difference. Also, Table 8 shows no significant difference in ILEs between the control group ($M=27.98$, $SD=5.09$) and the experiment group ($M=28.03$, $SD=5.24$) at $t=-0.050$, $p=0.960$ after the experiment. Therefore, H_{07} and H_{08} were accepted.

Next, regression analysis was conducted to examine the mediating effect of the L2MSS components between *Liushu*-based instruction and ILEs.

Table 9: The result of mediating effect of L2MSS components between *Liushu*-based instruction and ILEs

	<i>c</i>	<i>a</i>	<i>b</i>	<i>a*b</i>	<i>c'</i>	<i>a*b</i>	<i>a*b / c</i>
	X to Y	X to M	M to Y	M	X to M to Y	95%BootCI	% of Total effect
	β	β	β	β	β		
IL2S	0.480	2.102*	0.175*	0.367	-0.112	-0.001~0.088	76.46%
OL2S	0.480	0.167	0.340**	0.057	-0.112	-0.066~0.081	
L2LE	0.480	1.077	0.156**	0.168	-0.112	-0.030~0.070	

*. Significant at level 0.05;

** . Significant at level 0.01;

X: Independent variable (*Liushu*);

Y: Dependent variable (ILEs);

M: Mediator (IL2S, OL2S, L2LE);

95%BootCI: 95% confidence interval

As seen in Table 9, the total effect of *Liushu*-based instruction on ILEs is 0.480, which is not significant. The influence of *Liushu*-based instruction on IL2S is significant with $\beta=2.102$, $p<0.05$, as well as it is significant the impact of IL2S on ILEs with $\beta=0.175$, $p<0.05$. Both a and b are significant, which indicates that IL2S has a significant mediating effect at $\beta=0.367$. However, the direct effect of *Liushu*-based instruction on ILEs is not significant ($\beta=-0.112$, $p>0.05$). The results show that *Liushu*-based instruction indirectly predicts the level of ILEs through the IL2S of L2MSS components. In other words, IL2S mediated 76.46% of the total effect between *Liushu* and ILEs.

OL2S has the strongest impact on ILEs at $\beta=0.340$, $p<0.01$, followed by L2LE ($\beta=0.156$, $p<0.01$). However, the result did not show a significant effect of *Liushu*-based instruction on OL2S and L2LE at $\beta=0.167$, $p>0.05$ and $\beta=1.077$, $p>0.05$, respectively. That is, at least one of a and b is insignificant. Thus, the researcher used bootstrap to test the significance of $a*b$. 95% BootCI represents the 95% confidence interval calculated by Bootstrap sampling. The 95% confidence interval containing zero, indicates that the mediation effect is not significant. As seen in Table 9, neither IL2S nor L2LE shows any significance. It can be concluded that IL2S and L2LE have no significant mediating effect between *Liushu*-based instruction and ILEs.

In short, although *Liushu*-based instruction has no direct influence on ILEs, it can indirectly influence ILEs through IL2S, which is the mediator. Thus, H_{09} was rejected.

5 Discussion and conclusion

This study investigated the impact of a 10-week *Liushu*-based instruction on Standard Chinese learners' motivation and ILEs in Laos. Both the control group and the experimental group have almost identical motivation and ILEs in the independent sample *t*-test results of the pre-tests. The post-test results, however, show a slight change in the average scores in the motivation of the control group, while it increases from 107.80 to 110.59 in the experimental group. Furthermore, it is more obvious that the paired-sample *t*-tests showed that the experimental group had significant differences in IL2S and L2LE between the pre-test and the post-test. IL2S, meaning something that somebody wants to become, represents a person's desire and as such is a powerful motivation for a student to learn a second language. In this process, *Liushu*-based instruction integrates the cultures to enhance learners' interest in learning Chinese characters (Li, 2018). This may encourage learners to have a stronger desire to become the so-called ideal learners of Standard Chinese. L2LE is one's experience in the learning environment influenced by teachers, courses, and teaching strategies. This result is in line with the view of Chen and Fu (2014) who believe that the application of *Liushu* can deepen learners' understanding and memory of Chinese characters, increase their interest in Chinese character teaching, and strengthen its effect.

The mediation test showed that *Liushu*-based instruction is likely to be a significant predictor of IL2S of L2MSS components. Although the paired *t*-test showed the L2LE changed significantly and positively in the experiment group, *Liushu*-based instruction was not a major predictor of L2LE in the regression analysis. This is an important finding because it emphasizes the need to deepen our understanding of *Liushu*-based instruction in motivational processes. A second key finding was the predictive influence of IL2S, OL2S, and L2LE on ILEs. OL2S is a stronger predictor than IL2S and L2LE. In other words, OL2S, which indicated the motivation from others' expectations, played a larger effect on ILEs among learners. This finding is different from the results of Li and Zhang (2020) and Wong (2018) who found that IL2S exerted more influence on ILEs than OL2S among Tibetan learners and learners of Standard Chinese in Hong Kong, respectively. As Kormos & Kiddle (2011) stated, OL2S may have more relevance in the context where language education places great pressure on learners' performance. This means that in Laos, the pressure exerted by others (e.g., parents, peers) motivates learners to put more effort into learning Standard Chinese. Unfortunately, the *Liushu*-based method did not have a positive impact on learners' OL2S. To rephrase this result, motivation derived from external pressures or other people's expectations could not change easily with changes in teaching methods. As a result, *Liushu*-based instruction can indirectly influence ILEs only through IL2S, which is motivated by the learner's own desire for a second language. This study enhances understanding of the link between the instruction with *Liushu*-based instruction, L2MSS components, and ILEs among Standard Chinese learners in Laos.

This study demonstrates that *Liushu*-based instruction is considerably beneficial for creating positive effects on learners' IL2S and L2LE, which are the two components of motivation. It furthermore shows that *Liushu*-based instruction is good support in teaching Chinese characters. Teachers may use the source and structure of the characters involved in *Liushu* to make their teaching style more interesting, which is also the reason for the improvement of students' IL2S and L2LE. In addition, IL2S was found to mediate 76.46 % of the total effect of the relationship between *Liushu*-based instruction and ILEs, which means that teachers should pay more attention to the cultural functions carried by *Liushu* to improve students' IL2S and motivate them to spend more efforts on learning Standard Chinese.

However, it is important to note that applying *Liushu*-based instruction may be challenging for teachers of Standard Chinese. Although Chinese characters' composition has a strong basis, modern Chinese characters have undergone great changes in form, which may cause learners to get bored. This requires Standard Chinese teachers to have a deep knowledge of Chinese characters to identify the relationship between their form and meaning. According to Gao (2018), only Standard Chinese teachers with sufficient knowledge can ensure good teaching results. It is important for teachers to understand the nature and characteristics of Chinese characters, as well as

the evolution of Chinese characters, and teachers of Standard Chinese should possess enough professional knowledge to explain these phenomena.

As a second recommendation, teachers should adjust *Liushu*-based instruction to the characteristics of learners. As stated by Gao (2018), learners of Standard Chinese that have relatively weak receptivity could easily get exhausted by even some simple Chinese learning. Adding the knowledge of *Liushu* (e.g., the evolution of characters) would likely increase their learning burden to the limits. Furthermore, in the current study, the learning time of Chinese characters was much longer in the experimental group than in the control group. Learning Chinese characters is the most time-consuming part of learning Standard Chinese for beginners. It is possible, however, that the use of *Liushu* for Chinese character learning is limited for intermediate and advanced learners since vocabulary and grammar learning will take more time and effort with the continuous increase of learning content. The learners' Standard Chinese levels should therefore be considered when assigning *Liushu* to learners.

Finally, teachers should limit the use of *Liushu* by considering the characteristics of Chinese characters. Chinese characters that are very different in shape or meaning from their ancient Chinese equivalents should no longer be explained by *Liushu*. As Fei (1998) stated, modern Chinese characters have undergone significant changes in form due to the emergence of simplified Chinese characters. It is true that *Liushu* can help students understand cultural meanings hidden in the original forms, however, it does little to help them memorize the characters in their simplified form if their present meaning had already lost the connection with the original meaning. Therefore introducing *Liushu* might even increase their workload. Last but not least, for learning pictographs, ideographs, and ideological compounds, it is best to focus on teaching simple components to avoid blindly tracing the source and causing more harm than good to the learners.

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