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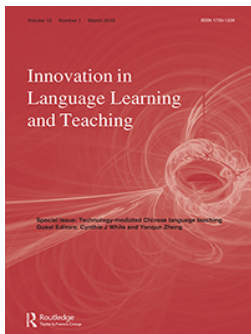
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<http://dx.doi.org/doi:10.1080/17501229.2018.1418633>

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To cite this article: Kan Qian, Nathaniel Owen & Stephen Bax (2018) Researching mobile-assisted Chinese-character learning strategies among adult distance learners, *Innovation in Language Learning and Teaching*, 12:1, 56-71, DOI: [10.1080/17501229.2018.1418633](https://doi.org/10.1080/17501229.2018.1418633)

To link to this article: <https://doi.org/10.1080/17501229.2018.1418633>



Published online: 10 Jan 2018.



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# Researching mobile-assisted Chinese-character learning strategies among adult distance learners

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## ABSTRACT

In the field of teaching and learning Chinese as a foreign language (CFL), most studies investigate Chinese character learning strategies in pen-and-paper study by campus-based students. With the increase in distance-learning, and expanding popularity of smartphones and tablets and widespread availability of mobile applications for language learning, it is now important to research mobile-assisted character learning strategies by distance learners. This study attempts to (i) identify changing practices when character learning is assisted by mobile technology; and (ii) analyse the underlying causes for the changing practices. These issues were investigated using an online survey, learning diary and email interviews with UK-based distance learners of beginners' Chinese ( $n = 22$ ). The findings suggest that there are important emerging new practices and previously unreported strategies such as constantly testing oneself and using pinyin input to identify new characters. They also reveal two strategy types not reported in previous research concerning social and affective dimensions. The study thereby provides important new insights into how adult distance learners of Chinese at beginners' level learn characters when assisted by mobile technology, with significant pedagogical implications for Chinese character pedagogy in terms of course design and learner support.

## ARTICLE HISTORY

Received 3 August 2017  
Accepted 27 October 2017

## KEYWORDS

Chinese character learning strategies; mobile-assisted language learning; technology; beginners' Chinese

## 1. Introduction

With the steady increase in the number of Chinese as a foreign language (CFL) learners in the world over the last decade (Hanban 2014), with more online Chinese courses available (Zhang 2013; Kan and McCormick 2014), and with an increasing number of learners actively engaging in mobile-assisted language learning (Arvanitis, Krystalli, and Panagiotidis 2016; Demouy et al. 2016; Mason and Zhang 2017; Rosell-Aguilar and Kan 2015), it is crucial for educators to understand how adult distance learners of Chinese use mobile technology to learn characters. It is widely acknowledged that the learning of Chinese characters is one of the biggest hurdles in CFL (Hu 2010; Jiang and Zhao 2001; Shen 2004), and learning language at distance adds extra challenges such as social isolation and anxiety (Hurd 2005), and lack of speaking opportunities (Kan and McCormick 2014), which can affect confidence and motivation. Distance learners also have to deal with 'the particular challenges of innovation' (White 2014, 548), such as using online classrooms. They are often time-poor as a large number of them are in full-time or part-time employment (Glogowska, Young, and Lockyer 2007), and they are relatively diverse in terms of age and educational background (Kan and McCormick 2014). These students, especially at the beginner level, need ample academic support including providing

them with a range of character learning strategies so that they can adopt or develop the ones that work for them, which may increase their confidence to complete their studies.

Previous studies have identified some common character learning strategies used by campus-based students (e.g. Jiang and Zhao 2001; Ke 1998; McGinnis 1999; Shen 2005; Sung and Wu 2011). However, there is very little research on mobile-assisted character learning strategies, and there is no research (to our knowledge) on mobile-assisted character learning strategies among distance learners. The present study aims to fill the gap by asking the following research question: *What strategies do beginner distance learners of Chinese use when learning characters assisted by mobile technology?*

Our study is guided by Oxford's (2003) definition of second language learning strategies, i.e. the 'specific behaviours or thoughts learners use to enhance their language learning' (1), and the six strategy categories proposed by Oxford: cognitive, metacognitive, memory-related, compensatory, affective and social (12–15). As part of the methodology, we adapted Shen's (2005) 30 common character learning strategies in order to partially replicate her study and to identify any emerging new practices.

In the following section, before explaining our methodology, we briefly review relevant literature on (i) challenges of learning characters; (ii) character learning strategies; and (iii) mobile-assisted language learning.

## 2. Literature review

### 2.1. Challenges of learning characters

It is well documented in the literature that the three tiers of characters-radicals-strokes orthographic structure of Chinese characters pose many challenges to CFL learners (e.g. Jiang and Zhao 2001; Poole and Sung 2015; Shen 2005; Sung and Wu 2011). Below we highlight some of the key challenges faced by beginners, which inform our critical reading of more general strategy literature and explain the intrinsic difficulties in character learning which influence strategic approaches by CFL learners.

#### 2.1.1. Character and Pinyin forms

Beginner learners have to learn two written forms (character and Pinyin) and pronunciation. Each character corresponds to a syllable which is transcribed using a Latin alphabet known as Pinyin. For example, the Pinyin form for 字 (character) is *zi*. There is no clear correspondence between the character form and its pronunciation (Jiang and Zhao 2001; Shen 2005). Many characters look similar but are pronounced totally differently (e.g. 找 *zhao*, 我 *wo*, 划 *hua*). Another layer of complication is that most syllables have four different tones, each of which carries one or more meanings (Shei 2015, 25). Pinyin is used not only to aid CFL learners to pronounce Mandarin sounds, but also to look up a new character in a dictionary and process characters.

#### 2.1.2. Large number of homophones

Learners face the challenge of large number of homophones in Chinese (Wong et al. 2010; Sung and Wu 2011). Many characters with different meanings share the same syllable, but are written in different strokes with no commonalities. For example, 资 (capital), 紫 (purple), 字 (character) are all pronounced *zi* with different tones.

#### 2.1.3. Number of strokes in each character

The smallest unit in forming a character is strokes, ranging from one to twenty or more strokes in one character. One of the first characters introduced at any beginner course is 谢 (thanks) with 12 strokes. An average number of strokes for the 2000 most used characters is 9.18 strokes (Zhao and Baldauf 2008, 48). There are also rules regarding stroke order (Kan 2009, 11–13). The popular view is that

writing characters in the correct stroke order facilitates character learning (e.g. Guan et al. 2011; Jagathan and Lee 2014).

#### 2.1.4. Compound characters

A further issue for learners is that many single characters with specific meanings are used to form compound characters. Each compound character consists of at least two components (known as 'radicals'), one indicating the meaning, and another providing the clue to the pronunciation. For example, 青 (green) is used to form many other compound characters such as 清 (clear) which consists of the semantic component 氵 ('water' association) and the phonetic component 青 (pronounced *qing*). In theory, whenever 青 occurs in a compound character, it should be pronounced *qing* (or similar to it), but it is not always the case. An analysis of 2500 commonly-used characters (Zhang 2007) reveals that 856 of them (35%) are single characters containing no phonetic indicator whilst 1644 of them are semantic-phonetic compounds (65%), much lower than the widespread belief that about 90% of commonly-used characters are semantic-phonetic compound characters (e.g. Poole and Sung 2015; Shen 2005; Sung and Wu 2011). Of those 1644 semantic-phonetic compound characters Zhang analysed, only 490 have the same or similar pronunciation with their phonetic components (29%). The high percentage of single characters with no phonetic indicator (35%), the lower percentage of accuracy of phonetic components (29%) and limited orthographic knowledge (Shen 2005) present significant challenges for beginner learners.

#### 2.1.5. Character structures

Learners also have to deal with 18 different ways compound characters are structured (Zhao 2014, 57–61). For example, 烫 (burning) consists of two components: 汤 at the top and 火 at the bottom. Visually, 汤 (soup) and 火 (fire) look different in shape when used independently from when they appear in a compound character because each character, regardless of number of strokes and components, must occupy the same space. This spatial inconsistency (Luo et al. 2013) poses visual-spatial challenges to beginner learners in character recognition.

In summary, the complexity of Chinese characters places a greater cognitive processing load on learners (Grenfell and Harris 2015). Studies indicate a heavier cognitive load for speakers of European languages learning Chinese than learning another European language (EBFC 2012; Poole and Sung 2015). As a result, different learning strategies have been adopted to deal with the challenges listed above. Below, we will briefly review studies on character learning strategies used by CFL learners.

## 2.2. Chinese character learning strategies

The most influential study to date on character learning strategies was conducted by Shen (2005) with 95 university non-native speakers ranging from beginners to advanced learners. The study identified 30 commonly-used strategies among all levels representing eight underlying psychological factors. Of these 30, Shen classified 25 as cognitive strategies, such as making connections with previously learnt characters, and five metacognitive strategies such as revising before class. Factor 1 represents a group of strategies labelled 'orthographic-knowledge-based learning strategies' (61), which rely on knowledge of semantic and phonetic components. But Shen points out that for beginner learners learning each radical or main component 'would not be perceived as useful' (2005, 61) due to their limited orthographic knowledge. Earlier studies by McGinnis (1999) and by Jiang and Zhao (2001) reported the same finding. Jiang and Zhao's study (2001) was another influential study ( $n = 138$  CFL beginners) which also reported that beginner learners focused more on the shape of the whole character, followed by repeating sounds and stroke order. They also found that learners from alphabetical language background relied more on phonological cues in recalling characters. However, quite a few studies on beginner CFL learners indicated that the knowledge of semantic-phonetic components was more useful than other strategies (e.g. Ke 1998; Taft and Chung 1999).

Wang, Perfettis, and Liu (2003) also reported that radicals played a very important role in recognising characters.

Shen's strategy inventory of 59 items (2005) has been widely adopted as it contained all the strategies reported prior to her study. For example, the study of 108 first-year university students on a Chinese course by Sung and Wu (2011) used Shen's complete inventory alongside variables such as gender and home background. Of the six types of strategy reported (683), four of them were cognitive, one was memory-related and one metacognitive. However, of the 30 most commonly-used items in the eight factor groups in Shen's study, eight items loaded on more than one factor, suggesting that the psychological factor groupings remain under-defined. Shen's study offers no interview data or open comments in the survey to further reveal participants' learning experiences so as to back up the interpretation of the factor structure and descriptive statistics. Our study addresses this by collecting data from multiple sources. Another shortcoming of Shen's study is that the classification of the strategy categories is too broad, putting many of the 30 items under cognitive strategies which should arguably be classified into memory-related, compensatory or social groupings instead. This aspect will also be addressed in our study.

In short, the literature on character learning strategies for beginners suggests that memory-related strategies and cognitive strategies play a crucial role in character learning. But can the potential of smart mobile technology influence character learning strategies? We will examine this possibility through a brief review of the literature on mobile-assisted language learning.

### **2.3. Mobile-assisted language learning**

Practices of language learning are changing rapidly in mobile technology-rich landscapes (Kukulka-Hulme 2012). A large-scale study by Demouy et al. (2016) reveals that many L2 distance learners are self-directed learners and they spend more time studying the target language than they did previously. Field research conducted by Arvanitis, Krystalli, and Panagiotidis (2016) also concludes that L2 learners in the digital age actively engage in using mobile applications for language learning.

In the field of CFL, mobile-assisted language learning is under-researched. Previous studies have investigated how a particular mobile application assists the learning of one aspect of the Chinese language and associated benefits (e.g. Chen 2013; Levy and Steel 2015; Wong et al. 2010). In terms of character learning strategies, the only study that touches on the topic is by Mason and Zhang (2017). Their main aim is to investigate why CFL learners at various levels use a range of mobile apps and match the app(s) with the language skill(s) practiced. They found that many learners 'use a dictionary app to look up words and sentences that contain the characters' (106) as looking up new characters in paper dictionaries is extremely time-consuming (101). Their study shows that beginner learners mainly use apps to identify components and to listen to pronunciation, which clearly demonstrates that using mobile apps is one of the strategies actively adopted by learners of Chinese at various levels.

The Open University's 'Chinese Characters First Steps' app (CCFS 2014) is an example of making use of the affordances of the smart mobile technology to tackle some of the challenges stated in 2.1 above. Below we describe how this app was utilised in our study.

## **3. Methodology**

### **3.1. Research context**

The Beginners' Chinese course at The Open University (OU) can be studied as one of the options for a degree programme or as a standalone course. Each student belongs to a tutorial group of about 20 students with a designated tutor who leads both online and face-to-face tutorial classes and marks assignments. Students are provided with textbooks, audio materials and online interactive language activities developed by the OU academic team. The course teaches Mandarin Chinese in its

standardised modern spoken form and in simplified characters. The course is designed for part-time study across 37 study-weeks. One of the first things the course teaches is how to enable the Chinese font on the computer and how to word-process, to reduce the labour intensity in handwriting characters in order to increase students' confidence and improve retention. By the end of course, students are expected to achieve A2 level as defined by the Common European Framework of Reference for Languages (Council of Europe 2001).

For the 2015–2016 academic year when this study was conducted, students were required to submit five assignments via an online system, two of which were speaking and three were writing, to assess their productive skills. Receptive skills in reading and listening were assessed by four interactive computer-marked assignments. For writing assignments, students could word-process or handwrite, but over 98% of students chose to word-process. Unlike handwriting where learners need to pay more attention to individual strokes, word-processing characters requires one to know the pinyin form well and to be skilful in character recognition.

### **3.2. The 'Chinese characters first steps' (CCFS) app**

The CCFS app was developed by the OU's Chinese course team in collaboration with university's Knowledge Media Institute in 2010 and upgraded in 2014 (CCFS 2014). The design principles of the app were bite-sized and progressive learning, integrating writing with listening, reading and vocabulary building in a fun and personalised way, which were valued by users (Rosell-Aguilar and Kan 2015).

The app contains over 400 characters in 20 lessons introduced in the OU's beginners' Chinese course. The 20 lessons chronologically build upon each other in the same order as the OU's Beginners' Chinese course books (Open University 2010a, 2010b). Students who register for the course are made aware of the app as one of the supplementary resources but its use is not compulsory.

### **3.3. Research aims and procedure**

The central aim of our study was to identify changing practices in character learning strategies used among beginner distance learners using mobile technology. 22 beginner Chinese students at the OU were recruited to take part in our 8-week project in May 2016. At the point when our project began, over 2/3 of the course content had been covered, and about 100 new characters were still to be introduced in the remainder of the course. Participants had the choice of joining one of two groups: the *book group* or the *app group*. Ten participants joined the book group to continue their studies using the course materials. Twelve joined the app group using the same course materials but with additional learning support offered by CCFS app. Each week, both groups were offered the same online multiple-choice test relating to the material covered in the week. Those tests were designed to reveal whether any changes in language learning strategies by the participants resulted in an attainment gap between the book and app groups. Participants were also provided with a learning diary template to write down their reflections each week. Both groups were supported by an online discussion forum with some character activities moderated by one of the researchers. An online survey was conducted at the end of the project with follow-up email interviews.

### **3.4. Research participants**

Out of 22 participants, 13 completed the 8-week study: nine from the app group and four from the book group. All of them are native speakers of English or another European language. Table 1 below displays the demographic profile of the 13 participants. In comparison with the overall OU Chinese learner profile (Kan and McCormick 2014), a higher percentage of participants in our study were from the older age groups and with a high-level education background. The sample was self-selecting and therefore judged to be highly-motivated.

**Table 1:** Research participants' profile. N: 13.

<b>Gender</b>	Male	5
	Female	8
<b>Age</b>	under 25:	2
	26–35:	3
	36–45:	2
	46–55:	3
	56 and over:	3
<b>Qualifications</b>	Less Than 2 A-Levels	2
	2+ A-Levels or Equivalent	4
	HE Qualifications	4
	Postgraduate Qualifications	3
<b>Experience with CCFS app</b>	With experience	7
	Without experience	6

### 3.5. Data sources and analysis

#### 3.5.1. Online tests

In the first week, participants completed a benchmarking test containing 30 items to ensure that there were no statistically significant differences between the two groups in terms of ability. For weeks 2–7, each of the tests contained 38 multiple-choice items. The final test in Week 8 contained 50 items. Each test consisted of three sections with different multiple-choice item types matching (i) each character with its English meaning; (ii) each character with its pinyin form; and (iii) character phrases or sentences with English translations. The tests assessed receptive skills relating to recognition of the characters they learnt during the project.

#### 3.5.2. Online survey

All 22 participants were invited to complete an online questionnaire, 13 responded, of which 11 were complete responses: eight from the app group and three from the book group. Two incomplete responses were removed from the data. The survey consisted of three sections: (1) evaluation of the app; (2) character learning strategies when learning new characters and when revising learnt characters; and (3) attitudes towards mobile language learning. This paper mainly reports the findings from sections 1 and 2.

Section 1 focused on specific aspects of the CCFS app (writing practice, listening test, reading test and word search) participants found most useful and why. Section 2 consisted of 32 character learning strategy items, of which 21 items were based on Shen's 30 common strategies (2005). Some of Shen's items were combined as they were judged to be similar in meaning and a few were removed as they did not apply to distance learners. The 11 different items in our study were based on some items from Shen's 59 items (2005, 65–66) as well as on comments by previous OU students who exchanged their ideas about character learning in the dedicated course forum. Of those 32 items, two were removed from the data due to duplication with the same statistics (see Appendix for the 30 items). After each strategy item, participants were asked to choose one of four options reflecting their use of that strategy: 'Never or almost never', 'Generally not true', 'Generally true' or 'Always or almost always true'. There were also open-ended questions inviting participants to report other strategies they used in addition to the 32 items provided.

Participants were asked to reflect on the character learning strategies they had used since they started learning Chinese, not just the 8-week project period.

#### 3.5.3. Email interviews

To further explore some questions relating to character learning strategies which were not covered by the survey (e.g. 'You indicated in the survey that "listening to native speakers" is something you generally do. How do you do that?'), post survey emails were sent out to the two app group



participants who volunteered to be interviewed. Both replied to interview questions with a substantial amount of information.

#### 3.5.4. Learning diary

Ten participants completed the weekly learning diary (seven from the app group and three book group) with reflections on their learning. All ten of them also completed the online survey.

The above four data sources were triangulated to address the research question set out in the Introduction. The open comments in the survey, the email interview and reflection data in the learning diaries were analysed using content analysis method (Schwandt 2007), based on 'a variety of textual analyses that involve comparing, contrasting, and categorizing a corpus of data in order to test hypotheses' (Schwandt 2007, 41). We focus on identifying themes that can provide explanation for preferred learning strategies identified by descriptive statistics.

## 4. Results and discussion

Descriptive statistics from the pre-test and subsequent weekly tests revealed that there were no statistically significant differences between the groups at commencement or during the research in terms of their receptive skills in character recognition. Both groups scored consistently highly on the tests, suggesting that all the self-selecting participants were highly motivated for the study and proficient at short-term character recognition.

As only three participants from the book group completed the project, we are not able to compare two groups as originally envisaged. Below we present results and analysis of survey data mainly from the app group, but combined results with the book group will be mentioned when relevant to our research question.

*What strategies do beginner distance learners of Chinese use when learning characters assisted by mobile technology?*

Of our 30 strategy items in the survey, 17 strategies were recorded as either 'generally true' or 'almost always true' for more than 50% of respondents. For the ranking of the full list of the 30 items, see Appendix A. Table 2 is the ranking of our top 17 strategies in comparison with Shen's top 30 (2005). There are three groups: (i) items in **bold** are emerging new strategies; (ii) items in **italic and bold** are strategies that recorded different degree of importance in our study; and (iii) *italicised items* represent the same (or very similar) findings. Column 1 is the ranking with our analysis of the strategy categories based on Oxford (2003). The percentages in brackets in column 4 represent the book and app groups combined; those outside brackets represent just the app group.

We will now discuss each of these three groups in turn in the first two sections below: new strategies and strategies that recorded different degree of importance in 4.1; and strategies that remain the same in 4.2. In 4.3, we will discuss two new strategy categories revealed by our data.

### 4.1. Changing practices

#### 4.1.1. New strategies

Five new strategies emerged from the data, four of which are heavily impacted by advances in computer and mobile technology. All five were not among Shen's top 30 items. Each is discussed below.

##### 4.1.1.1. Use an online dictionary to find out how the character is used in context (ranked 6th).

This high ranking strategy supports previous research findings (Levy and Steel 2015; Mason and Zhang 2017) in that it reduces the workload of checking a paper dictionary, connects the character with the appropriate meaning in context and facilitates the link between character, pinyin and pronunciation as most online dictionaries have audio embedded. Strategies that help to save time and reduce workload fall into the metacognitive category, whilst sense-making in context is a compensatory strategy. We therefore consider this a metacognitive-compensatory strategy.

**Table 2.** Comparison of the ranking of our character learning strategies with Shen's ranking (2005, 57). N: 11 for percentage inside the brackets; 8 for percentages outside the brackets.

Ranking/Strategy group	Item No	Our strategy items	% score ≥3*	Shen's top 30 ranking and item wording
1 (Metacognitive)	Q11**_10	<b><i>I test myself to check if I have learnt the character(s)</i></b>	100% (100%)	<b>13</b> 'Quiz myself'
2 (Memory)	Q10***_1	<i>I repeat the sound when the character is first introduced</i>	88% (92%)	<b>1</b>
3 (Metacognitive)	Q10_13	<b><i>I try to find a connection between the new character and previously learned characters</i></b>	88% (91%)	<b>24</b> 'Finds the connection between the new character and previously learned radicals in terms of sound, meaning and shape'
4 (Cognitive)	Q10_12	<i>I try to visualise the character and compare it with a familiar shape</i>	88% (84%)	<b>8</b>
5 (Social)	Q11_6	<b><i>I listen to conversation by native speakers</i></b>	75% (64%)	<b>30</b>
6 (Metacognitive)	Q11_14	<b><i>I use an online dictionary to find out how the character is used in context</i></b>	75% (54%)	<b>[not in top 30]</b>
7 (Compensatory)	Q11_13	<i>I focus on how the character is used in context</i>	75% (72%)	<b>9</b>
8 (Cognitive)	Q10_3	<i>I practice the tone and associate it with pinyin</i>	75% (75%)	<b>2</b>
9 (Cognitive)	Q11_1	<b><i>I say the character when writing it (either on digital device or paper)</i></b>	63 (63%)	<b>22</b>
10 (Metacognitive-Cognitive-)	Q10_7	<b><i>I use pinyin input on my computer/digital device to choose/identify new characters</i></b>	63% (50%)	<b>[not in top 30]</b>
11 (Cognitive)	Q10_6	<b><i>I focus on the phonetic component (the part that indicates the pronunciation)</i></b>	50% (42%)	<b>[not in top 30]</b>
12 (Cognitive)	Q11_3	<b><i>I listen to the sound and try to associate its sound with meaning and shape</i></b>	50% (36%)	<b>28</b> 'Associates the sound of a character with its meaning and shape'
13 (Cognitive)	Q10_2	<i>I listen carefully to the pronunciation of the new character before I write it</i>	50% (58%)	<b>16</b>
14 (Metacognitive)	Q10_5	<b><i>I try to pronounce it myself by looking at pinyin first, and then listen to the model pronunciation</i></b>	50% (66%)	<b>[not in top 30]</b>
15 (Memory)	Q10_8	<b><i>I write/draw each new character stroke by stroke (on paper or on digital device) many times</i></b>	50% (58%)	<b>4</b> 'Writes the character down when it is first introduced'
16 (Metacognitive)	Q10_11	<b><i>I preview all the new characters in each lesson/session before going into a particular one</i></b>	50% (50%)	<b>[not in top 30]</b>
17 (Memory)	Q11_5	<i>I try to memorise the stroke order first, then the sound and meaning</i>	50% (36%)	<b>18</b>

\*% is the cumulative percentage of respondents who chose 'Generally true' and 'Always or almost always true' for this particular strategy.

\*\*Items starting with Q11 are about revising learnt characters.

\*\*\*Items starting with Q10 are about when learning new characters.

It should be noted that in Shen's top 30, the strategy 'Check reference sources for character's meaning (in various contexts)' ranked 11th (2005, 57), but at that time online Chinese dictionaries were in their infancy and so resources referred to were mainly in their print form.

**4.1.1.2. Use pinyin input to choose/identify characters (10th).** Word-processing has become a different means for training character recognition. Due to multiple characters sharing the same syllable(s), the mobile/computer screen can present all the options at once. For example, when keying in 'zi', eight to ten commonly used characters sharing the same pinyin 'zi' are provided for the user to choose from (see Figure 1).

If the desired character is not in the list, tap the right arrow key for the next group of options. Two or more syllables can be keyed in together for a word/phrase that is made up by more than one character. For example, type 'xiezi', seven options are given first, choose 1 for 'shoe' and choose 4 for 'write characters' (see Figure 2).

Our data indicates that this is not a clear-cut cognitive strategy as using the pinyin input not only saves time but also functions as a multiple-choice test for learners to choose the right character(s). Using pinyin to produce characters requires learners to focus more on the whole shape of a character rather than individual strokes as well as getting used to the visual and spatial inconsistency discussed in 2.1 above. StudentB2 from the book group also used this strategy as she noted in the diary 'Typing additional vocab and/or phrases into vocab list helps', suggesting this approach is additionally a deliberate metacognitive learning strategy.

**4.1.1.3. Focus on the phonetic component (11th).** The higher ranking of this cognitive strategy, in comparison to focusing on the semantic component (ranked 22nd, see Appendix A), indicates that the challenge of low accuracy of phonetic components outlined in section 2.1 pushes learners to pay attention to it. It also supports the study by Jiang and Zhao (2001) that learners with alphabetic language background pay more attention to the phonological cues. Most importantly, this may suggest the impact of mobile technology as embedded audios in apps make the listening more accessible. However, some beginner learners do pay attention to both phonetic and semantic components, as noted by StudentB2 in the diary: 'Linking characters with learnt common components is helpful'.

**4.1.1.4. Pronounce it myself, and then listen to the model pronunciation (14th).** This approach is a metacognitive strategy used to forge explicit cognitive links between character recognition, receptive and productive sounds associated with that character. This strategy was specifically encouraged by the app design, as the CCFS app and many other apps provide model pronunciation, and learners can record themselves on smart phones. It is interesting that the percentage for this strategy is higher when the book group data is included, which suggests that adult learners tend to challenge and test themselves. It may also be due to the features of distance online learning with the full provision of audio materials online and downloadable.

**4.1.1.5. Preview all the new characters in each lesson before going into a particular one (16th).** The use of this metacognitive strategy by both groups indicates that adult learners tend to skim the task before focusing on details as both groups scored equally here. Explaining why she liked the Word Search puzzle in CCFS app, StudentA1 from the app group explained 'I always begin by the word

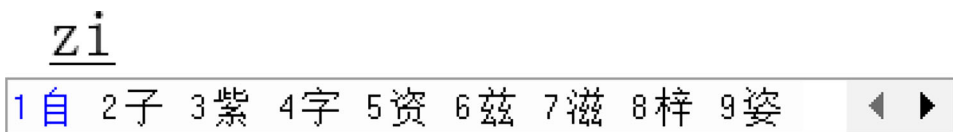


Figure 1. Screen capture of typing 'zi' using pinyin input.

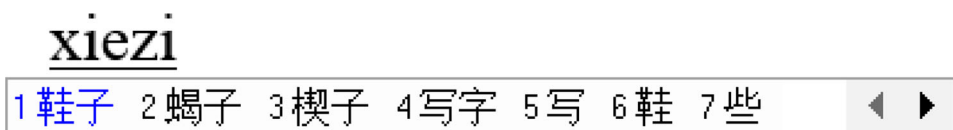


Figure 2. Screen capture of typing 'xiezi' using pinyin input.

search to have an overview of what i am going to learn. It enables me to play with new characters, expressions to discover’.

#### **4.1.2. Strategies with different degree of importance**

Table 2 also tells us that some strategies, as examined below, although similar to Shen’s study in 2005, are more important whilst others are less important to beginner distance learners.

**4.1.2.1. Test myself to check if I have learnt the character(s) (1st in ours but 13th in Shen’s).** The highest ranking of this metacognitive strategy is evidence of the impact of mobile language apps which learners can use to easily test themselves. When we include the three respondents from the book group, the percentage remains the same, which supports Hurd’s finding that ‘metacognitive strategies may have an enhanced role for the learner of a language at a distance’ (2000, 61); indeed White’s study indicated that over 51% of strategy categories reported by distance learners were metacognitive in nature (1999, 42). There is also ample evidence from the open-comments data that app group participants liked the Reading/Listening Test part of the CCFS app: ‘I started getting most wrong, but kept repeating and then doing so the next day’ [StudentA6], ‘I particularly like the fact that you can change from English to pinyin so you can test yourself all round’ [StudentA2]. StudentB3 from the book group noted in the diary that she tested herself and ‘getting all the characters right felt good’.

**4.1.2.2. Find a connection between the new character and previously learned characters (3rd in ours but 24th in Shen’s).** This is a cognitive strategy but can possibly be developed into a metacognitive one if it is habitually and consciously deployed. The percentage goes up from 88% to 91% when the book group is included, which may indicate that adult learners are better at managing their studies by using metacognitive strategies which build upon cognitive processes, as evidenced by the following revelation: ‘I decided to complete my head component posters by writing new characters next to the corresponding root’ [StudentA1, diary] and ‘Linking characters with learnt common components is helpful’ [StudentB2, diary].

**4.1.2.3. Listen to conversation by native speakers (5th in ours but 30th in Shen’s).** This higher ranking in our study is probably because our participants included watching film/TV programmes where they could hear conversations by speakers as it is easy to access TV programmes and YouTube films via mobile devices. The lower percentage when the book group is included (64% vs 75%) supports our analysis that more app group respondents access films from their mobile devices.

When I am listening to conversation, I am usually listening to TV shows and recorded files online, as I rarely have chance to interact with native speakers directly. [...] My primary source is YouTube, there’s a wealth of Chinese period dramas and learning resources [...], and it’s all free to access at my convenience! [StudentA4, Email interview].

This is a classical social strategy if it is in a face-to-face situation, but when it is online, may still be perceived by learners as a social interaction; a hypothesis which requires further research.

**4.1.2.4. Say the character when writing it (9th vs 22nd) and listen to the sound and try to associate its sound with meaning and shape (12th vs 28th).** Both of these two cognitive strategies ranked higher in our study than Shen’s, which may also be due to embedded audio in mobile apps and online materials, providing greater convenience than accessing audio through a CD player. This is supported by the survey data which indicates that 100% of respondents agreed that the Listening Test part of CCFS app was useful/very useful because ‘I loved working against the clock and being able to repeat it’ [Student A6] and ‘I enjoyed learning to link the right sounding word with the correct *hanzi*’<sup>1</sup> [StudentA1].

**4.1.2.5. Write/draw each new character stroke by stroke many times (15th in ours but 4th in Shen's).** This is a memory strategy; the lower ranking in our study could be due to the wording of the item in that respondents interpreted 'write' as 'handwrite' as opposed to 'type' or 'key in by pinyin input'. Another main reason is linked with the assessment strategy of the OU course because students could submit all their coursework in the word-processed format. Supporting this interpretation are comments such as

I didn't need to physically write things down often because most of my learning was through reading and listening, so I found reading online flash cards and using the FIRST STEPS app to be beneficial. [...] I rarely wrote things down, except using the computer which only required pinyin [...] [StudentA4].

## 4.2. Strategies that remain unchanged

The findings demonstrated some similarities in strategic metacognition between traditional character learning and mobile-assisted learning. The following four strategies are among the top ten in both our study and Shen's study (2005): '*repeat the sound when the character is first introduced*'; '*visualise and compare with a familiar shape*'; '*focus on how the character is used in context*'; and '*practice the tone and associates it with pinyin*'. These findings confirm that the main strategies in learning characters for CFL learners remain the same for face-to-face and distance learners regardless of the availability of mobile technology due to the intrinsic challenges explained in 2.1.

Repetition of the sound assists memorising pronunciation which cannot be decoded otherwise due to the lack of correspondence between character and sound. StudentA5 explains the need to listen repeatedly '... it helps to associate the sound of a character with either the character or the English meaning'. Constant practice of tone and associating it with pinyin would facilitate the connection between pronunciation, the character and the pinyin form.

The strategy '*visualise and compare with a familiar shape*' ranks higher than '*memorise the stroke order*', indicating that for beginner learners, the shape of the whole character plays a more important role than individual strokes, especially when word-processing. This finding supports previously reported finding by Jiang and Zhao (2001) that beginners relied more on the whole shape in recognising characters.

The compensatory strategy '*learning the characters in context*' remains one of the top ten as context helps learners deal with the ambiguity caused by sheer number of strokes and homophones so that they can make sense of the characters. StudentA8 in the diary noted: 'it would be more useful to learn phrases or provide some kind of context'. In the email interview, StudentA4 mentioned that context helps with the difficulty in deciding 'when one word ends and another begins' in a sentence 'but grammar patterns, measure words and general vocab knowledge help'. This is a challenge in reading unreported in previous studies: a word in Chinese can be one character, two or three characters, and each character takes up exactly the same space. There is no textual marker to separate words or to indicate if a word is a proper noun such as a space between words and upper case in English for personal name or place names. Data from Section 1 of the survey on the usefulness of the word search in CCFS app also indicates learning-in-context is a common strategy: 100% respondents found Word Search useful (including 'very useful') because it provides 'opportunities to choose characters in context' [StudentA8].

## 4.3. New strategy categories

As reviewed in 2.2, most commonly reported strategy categories in character learning include cognitive, metacognitive and memory-related strategies. Analysis of open-comments in the survey and the diaries in our data also revealed the following previously unreported strategy categories.

### 4.3.1. Social strategy

In 4.1.2, we mentioned a social strategy ‘*Listen to conversation by native speakers*’, which may not be considered a social strategy in an online context. But the following learning strategies are clearly to promote social interaction:

- ‘look up new characters in online dictionary before writing to Chinese friend; reusing characters my friend has used.’ [StudentA8]
- ‘ask for help from a Chinese speaker when stuck’ [StudentA7]
- ‘write three or four sentences and play with the use of the words checking with Chinese speakers I occasionally have access to mainly through WeChat’ [StudentA6]

### 4.3.2. Affective strategy

It is well researched in distance foreign language learning that affect plays a key role in learner confidence and is also aligned with learner autonomy (Hurd 2005; White 1997). Getting compliments from a native speaker is surely a confidence booster as noted by StudentA5 in the diary after showing his work to his Chinese friend ‘[...] my Chinese friend was impressed that I could remember the characters!’. It is possible that over a period of time, sharing one’s good work with others and receiving affective support may become a learning strategy to motivate oneself.

## 5. Conclusion

Our study concludes with four major findings for beginner distance learners learning Chinese characters with the assistance of computer and mobile technology, all of which we suggest will be of importance in future pedagogical models and practice in this field.

Firstly, the study has identified strategies most commonly used by adult distant learners: *regularly testing oneself* and *trying to find connections between new and learnt characters*. Amongst the top ten common strategies reported by our respondents, four of them are due to the convenience of computer and mobile technology: *regularly testing oneself*, *watching video to hear conversation by native speakers*, *using online dictionaries* and *using pinyin input on digital devices to identify new characters*.

Secondly, our study has recognised new strategies, not reported in previous studies, that fall into ‘social’ and ‘affective’ categories (e.g. *reusing characters used by friend*, *checking with Chinese speakers through WeChat*, *impressing a Chinese friend*). These two categories need to be further researched to find out if they are motivational strategies just for distance learners or if they work for all CFL learners. The study has also demonstrated that some strategies build upon the cognitive processing required in character recognition.

Thirdly, in terms of strategy categories, more metacognitive strategies were used by our respondents than in previous studies. Amongst the top 17 strategies, the most commonly used are cognitive (six) and metacognitive (six including item Q10\_7 that contain cognitive elements). Three are memory-related, one compensatory, and one potentially social. Our study supports previous research findings (Hurd 2000; White 1997, 1999) that distance learners use more metacognitive strategies compared to campus-based learners as distance learners tend to do more reflecting on, planning and organising of their studies.

Finally, this study has demonstrated that, due to the inherent challenges of character learning, some common character learning strategies remain unchanged regardless of physical setting and platform, such as *repeating the sound*, *visualising the character*, *using it in context* and *practising of tones*. The results of this study also support the view that orthographic-knowledge-based strategies such as learning each radical are not preferred by beginner learners (Jiang and Zhao 2001; McGinnis 1999; Shen 2005).

This study has thereby demonstrated that, due to the inherent challenges of character learning, some common character learning strategies remain unchanged regardless of physical setting and

platform, such as repeating the sound, visualising the character, using it in context and practising of tones.

A limitation of this study is that the sample sizes for both groups were relatively small. In addition, there were no social and affective strategy items in the survey, a lacuna which we aim to remedy in future studies.

Notwithstanding, we suggest that the findings of this investigation of the changing practices in character learning, together with the revelation of a new challenge of character learning, i.e. lack of meaning boundary markers, have significant pedagogical implications for teaching Chinese characters at beginners level to both distance and face-to-face learners in two central aspects: course design and learner support. In terms of designing beginners' Chinese courses, educators should consider the following aspects: placing more emphasis on characters in use in short sentences than teaching individual strokes, radicals and characters in isolation; embedding the use of mobile applications as a revision tool; and designing effective and bite-size language activities for learners to test themselves. In regard to learner support, educators and practitioners should consider providing recommendations for character learning strategies used by former students, and encourage learners to reflect on their own practices and develop learning strategies that suit their own study goal. Future research is needed to explore if the raised awareness of one's own character learning strategies has any positive impact on learner confidence, motivation and long-term retention of Chinese characters.

## Note

1. Pinyin form for 汉字, meaning 'characters'.

## Acknowledgements

We would like to dedicate this paper to Professor Stephen Bax who provided many valuable suggestions and revised it on 21st of November 2017, the day before he passed away.

We would also like to thank Tang Jinlan for her help with the initial data analysis.

## Disclosure statement

No potential conflict of interest was reported by the authors.

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## References

- Arvanitis, P., P. Krystalli, and P. Panagiotidis. 2016. "Applications for Mobile Assisted Language Learning: A Current Field Research." 10th international technology, education and development conference, Valencia, Spain, March 2016, CD-ROM, INTED2016 Proceedings, 7645–7651.
- Chen, D. 2013. "What Can a Smartphone Offer to Learners of Chinese?" *Journal of Technology and Chinese Language Teaching* 4 (2): 86–95.
- Chinese Characters First Steps. 2014. <http://itunes.apple.com/gb/app/chinese-characters-first-steps/id441549197?mt=8> (iOS). [Compatible with versions below iOS 11; replacement app in preparation for 2018] <https://play.google.com/store/apps/details?id=uk.ac.open.kmi.chinesecharacters> (Android).
- Council of Europe. 2001. *Common European Framework of Reference for Languages: Learning, Teaching, Assessment*. Cambridge: Cambridge University Press.
- Demouy, V., A. Jones, Q. Kan, A. Kukulska, and A. Eardley. 2016. "Why and How Do Distance Learners use Mobile Devices for Language Learning?" *The EuroCALL Review* 24 (1): 10–24.
- European Benchmark Framework for Chinese Final Report (EBFC). 2012. [http://eacea.ec.europa.eu/LLp/projects/public\\_parts/documents/languages/lan\\_mp\\_511644\\_EBCLfinal.pdf](http://eacea.ec.europa.eu/LLp/projects/public_parts/documents/languages/lan_mp_511644_EBCLfinal.pdf).
- Glogowska, M., P. Young, and L. Lockyer. 2007. "Should I Go or Should I Stay?" *Active Learning in Higher Education* 8 (1): 63–77.
- Grenfell, M., and V. Harris. 2015. "Memorisation Strategies and the Adolescent Learning of Mandarin Chinese as a Foreign Language." *Linguistics and Education*, 31: 1–13. doi:10.1016/j.linged.2015.04.002.
- Guan, C. Q., Y. Liu, D. H. L. Chan, F. Ye, and C. A. Perfetti. 2011. "Writing Strengthens Orthography and Alphabetic-Coding Strengthens Phonology in Learning to Read Chinese." *Journal of Educational Psychology* 103 (3): 509–522. doi:10.1037/a0023730.
- Hanban. 2014. "Confucius Institute Annual Development Report." <http://www.cim.chinesecio.com/hbcmcs/f/journal/journalDetail?id=c273cf3b5b2c476ca86c73425be932c0&langType=en>.
- Hu, B. 2010. "The Challenges of Chinese: A Preliminary Study of UK Learners' Perceptions of Difficulty." *Language Learning Journal* 38: 99–118.
- Hurd, S. 2000. "Distance Language Learners and Learner Support: Beliefs, Difficulties and use of Strategies." *Links and Letters 7: Autonomy in Language Learning* 7: 61–80.
- Hurd, S. 2005. "Autonomy and the Distance Language Learner." In *Distance Education and Languages*, edited by B. Holmberg, M. Shelley, and C. White, 1–19. Frankfurt Lodge: Multilingual Matters.
- Jaganathan, P., and P. L. Lee. 2014. "Knowledge and Perception of Stroke Order among Chinese-as-a-Foreign Language Students in a Malaysian University." *International Journal of Education and Research* 2 (11): 147–160.
- Jiang, X., and G. Zhao. 2001. "江新、赵果. 初级阶段外国留学生汉字学习策略的调查研究 [A Survey on the Strategies for Learning Chinese Characters among CSL Beginners]." *Language Teaching and Linguistic Studies* 4: 10–16.
- Kan, Q. 2009. *Colloquial Chinese*. 2nd ed. London: Routledge.
- Kan, Q., and R. McCormick. 2014. "Building Course Cohesion: The Use of Online Forums in Distance Chinese Language Learning." *Computer Assisted Language Learning* 27 (1): 44–69. doi:10.1080/09588221.2012.695739.
- Ke, C. 1998. "Effects of the Strategies on the Learning of Chinese Characters among Foreign Language Students." *Journal of the Chinese Language Teachers Association* 33: 93–112.
- Kukulska-Hulme, A. 2012. "Language Learning Defined by Time and Place: A Framework for Next Generation Designs." In *Left to My Own Devices: Learner Autonomy and Mobile Assisted Language Learning. Innovation and Leadership in English Language Teaching*, edited by Javier E. Diaz-Vera, vol. 6, 1–13. Bingley, UK: Emerald Group Publishing Limited.
- Levy, M., and C. Steel. 2015. "Language Learner Perspective on the Functionality and use of Electronic Language Dictionaries." *ReCall* 27 (2): 177–196. doi:10.1017/S095834401400038X.
- Luo, Y. C., X. Chen, S. H. Deacon, J. Zhang, and L. Yin. 2013. "The Role of Visual Processing in Learning to Read Chinese Characters." *Scientific Studies of Reading* 17 (1): 22–40.
- Mason, A., and W. Zhang. 2017. "An Exploration of the Use of Mobile Applications to Support the Learning of Chinese Characters Employed by Students of Chinese as a Foreign Language." In *Beyond the Language Classroom: Researching MOOCs and Other Innovations*, edited by Q. Kan and S. Bax, 99–112. Dublin Ireland: Research-publishing.net.
- McGinnis, S. 1999. "Students' Goals and Approaches." In *Mapping the Course of the Chinese Language Field*, edited by M. Chu, 151–188. Kalamazoo, MI: Chinese Language Teachers Association.
- Open University. 2010a. *L197 Beginners' Chinese (Book 1 and Book 2)*. Milton Keynes: The Open University.
- Open University. 2010b. *L197 Beginners' Chinese (Practice Book 1 and Practice Book 2)*. Milton Keynes: The Open University.
- Oxford, R. L. 2003. "Language Learning Styles and Strategies: An Overview." *Proceedings of GALA (Generative Approaches to Language Acquisition) Conference*, 1–25. <http://web.ntpu.edu.tw/~language/workshop/read2.pdf>.
- Poole, F., and K. Sung. 2015. "Three Approaches to Beginning Chinese Instruction and Their Effects on Oral Development and Character Recognition." *Eurasian Journal of Applied Linguistics* 1: 59–75.
- Rosell-Aguilar, F., and Q. Kan. 2015. "Design and User Evaluation of a Mobile app to Teach Chinese Characters." *Journal of the JALTCALL SIG* 11 (1): 19–40.



- Schwandt, T. A. 2007. *The SAGE Dictionary of Qualitative Inquiry*. SAGE Publications. doi:10.4135/9781412986281.
- Shei, C. 2015. *Understanding the Chinese Language: A Comprehensive Linguistic Introduction*. New York: Routledge.
- Shen, H. H. 2004. "Level of Cognitive Processing: Effects on Character Learning Among Non-Native Learners of Chinese as a Foreign Language." *Language and Education* 18 (2): 167–182. doi:10.1080/09500780408666873.
- Shen, H. H. 2005. "An Investigation of Chinese-Character Learning Strategies among non-Native Speakers of Chinese." *System* 33: 49–68.
- Sung, K., and H. Wu. 2011. "Factors Influencing the Learning of Chinese Characters." *International Journal of Bilingual Education and Bilingualism* 14 (6): 683–700.
- Taft, M., and K. Chung. 1999. "Using Radicals in Teaching Chinese Characters to Second Language Learners." *Psychologia* 42: 234–251.
- Wang, M., C. A. Perfettis, and Y. Liu. 2003. "Alphabetic Readers Quickly Acquire Orthographic Structure in Learning to Read Chinese." *Scientific Studies of Reading* 7 (2): 183–208.
- White, C. 1997. "Autonomy and Strategy Use in Distance Foreign Language Learning: Research Findings." *Systems* 23 (2): 207–222.
- White, C. 1999. "The Metacognitive Knowledge of Distance Learners." *Open Learning* 14 (3): 37–47.
- White, C. 2014. "Thinking Allowed: The Distance Learning of Foreign Languages: A Research Agenda." *Language Teaching* 47 (4): 538–553. doi:10.1017/S0261444814000196.
- Wong, L. H., C. K. Chin, C. L. Tan, and M. Liu. 2010. "Students' Personal and Social Meaning Making in a Chinese Idiom Mobile Learning Environment." *Journal of Educational Technology and Society* 13 (4): 15–26.
- Zhang, X. 2007. "张熙昌. 论形声字声旁在汉字教学中的作用. 语言教学与研究 [The Application of Chinese Character Phonetic Components in Chinese Teaching]." *Language Teaching and Linguistic Studies* 2: 21–28.
- Zhang, Y. 2013. "Power Distance in Online Learning: Experience of Chinese Learners in U.S. Higher Education." *The International Review of Research in Open and Distance Learning* 14 (4): 238–254.
- Zhao, M. 2014. Chinese Character Components, Radicals and Phonetics. *Unpublished Master's thesis*. University of Manchester.
- Zhao, S., and R. Baldauf. 2008. *Planning Chinese Characters: Reaction, Evolution or Revolution?* New York: Springer.

## Appendix A: Ranking of 30 character learning strategies (N: 8 from the App Group)

Rank	Item number	Strategies	M	SD	% score $\geq 3$ *	% score = 4 **
1	Q11_10	I test myself to check if I have learnt the character(s)	3.25	0.46	100	25
2	Q10_1	I repeat the sound when the character is first introduced	3.38	0.74	88	50
3	Q10_13	I try to find a connection between the new character and previously learned characters	2.88	0.83	88	13
4	Q10_12	I try to visualise the character and compare it with a familiar shape	2.88	0.35	88	0
5	Q11_6	I listen to conversation by native speakers	2.88	0.64	75	13
6	Q11_14	I use an online dictionary to find out how the character is used in context	2.75	0.89	75	13
7	Q11_13	I focus on how the character is used in context	3.00	0.76	75	25
8	Q10_3	I practice the tone and associate it with pinyin	2.50	0.93	75	0
9	Q11_1	I say the character when writing it (either on digital device or paper)	2.63	1.19	63	25
10	Q10_7	I use pinyin input on my computer/digital device to choose/identify new characters	2.63	0.92	63	13
11	Q10_6	I focus on the phonetic component (the part that indicates the pronunciation)	2.63	0.74	50	13
12	Q11_3	I listen to the sound and try to associate its sound with meaning and shape	2.38	1.06	50	13
13	Q10_2	I listen carefully to the pronunciation of the new character before I write it	2.50	0.93	50	13
14	Q10_5	I try to pronounce it myself by looking at pinyin first, and then listen to the model pronunciation	2.75	0.89	50	25
15	Q10_8	I write/draw each new character stroke by stroke (on paper or on digital device) many times	2.63	1.06	50	25
16	Q10_11	I preview all the new characters in each lesson/session before going into a particular one	2.38	1.30	50	25
17	Q11_5	I try to memorise the stroke order first, then the sound and meaning	2.38	1.30	50	25
18	Q11_7	I write it many times (on paper or on a digital device).	2.13	0.83	38	0
19	Q11_8	I focus on stroke orders	2.13	0.83	38	0
20	Q11_9	I spend more time writing the radicals/head component (the part indicating meaning) than the phonetic component (the part indicating the sound)	2.13	0.83	38	0
21	Q10_9	I focus more on the radical/head component (the part that indicates the associated meaning) by writing it many times	2.00	0.76	25	0
22	Q11_11	I check the meaning of each component in the character	2.00	0.76	25	0
23	Q10_14	I make up a story for some characters	1.88	0.83	25	0
24	Q10_17	I make my own paper flashcards	1.75	0.89	25	0
25	Q11_2	I read the character out loud first, and try to associate its sound with meaning	2.25	0.46	25	0
26	Q11_4	I try to memorise the sound first, then the meaning and shape	2.00	0.76	25	0
27	Q11_12	I group the characters that share the same components together	1.50	0.76	13	0
28	Q10_18	I use an online flashcard maker (e.g. Quizlet)	1.50	0.76	13	0
29	Q10_4	I identify a similar-sounding word from my native language (e.g. English, Spanish)	1.25	0.46	0	0
30	Q10_15	I make up an expression or simple sentence with this character, and note it down	1.25	0.46	0	0

\*% is the cumulative percentage of respondents who chose 'Generally true' and 'Always or almost always true' for this particular strategy.

\*\* % is the percentage of respondents who chose 'Always or almost always true' for this particular strategy.

### Notes

(1) Item Q10\_10 was deleted due to its duplication with Q10\_13; and item Q10\_16 was deleted due to its duplication with Q10\_16 (stats for both were the same).

(2) Items starting with Q11 are about when revising learnt characters.

(3) Items starting with Q10 are about when learning a new character.