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Reevaluating the bùshǒu 部首 System: Enhancing Key-Based Pedagogy for Modern Chinese Character Acquisition in L2 Learners

Abstract

This paper examines the pedagogical significance of the bùshǒu 部首 key component system in teaching modern Chinese characters to second language (L2) learners. It identifies key challenges in character acquisition, critiques inconsistencies in traditional and contemporary pedagogical frameworks, and proposes etymology mnemonics for integrating key analysis into L2 instruction. By synthesizing historical lexicography, cognitive linguistics, and empirical studies, this research advocates for a restructured approach to bushou pedagogy to improve character literacy outcomes.

Keywords: Chinese character pedagogy, character acquisition, second language acquisition, bushou, components

孔茗

重新评估部首系统：优化部首教学法以促进二语学习者的现代汉字习得

摘要

本文探讨了在对外汉语（L2）教学中，部首关键构件体系在现代汉字教学中的教育学意义。文章指出了学习者在汉字习得过程中面临的主要挑战，批判性地分析了传统与当代教学体系中的不一致之处，并提出通过词源助记法（etymology mnemonics）将部首分析融入二语教学的方法。研究综合了历史词典学、认知语言学与实证研究成果，倡导对部首教学体系进行重构，以提升汉字读写教学的整体成效。

关键词： 汉字教学法, 汉字习得, 第二语言习得, 部首, 部件

Introduction

Rising demand for Chinese proficiency in Hungary, driven by initiatives like the Belt and Road, necessitates effective pedagogical methodologies for character acquisition. Yet mastering Chinese script remains a significant hurdle for L2 learners due to its morphosyllabic complexity and underdeveloped pedagogical frameworks. This paper argues that systematizing instruction around the bushou key component system can mitigate these challenges. We explore the historical evolution of bushou, its cognitive advantages for learners, and propose revisions to modern pedagogy grounded in etymological accuracy.

1. Terminology and notation

The standard term is *bùshǒu* 部首, often translated as *key* or *indexing component*. In the literature it is also referred to as *classifier*, *head graph*, *section header*, or *radical*. However, the term *radical* is misleading, since most keys do not indicate the true root etymology of a character. Moreover, prior scholarship shows considerable terminological ambiguity, as these labels are frequently used interchangeably or with overlapping definitions, which obscures the distinction between keys used for lexicographical indexing and components analysed for pedagogical or functional purposes.

To avoid such ambiguity, this paper adopts a clear terminology policy. *Bùshǒu* 部首 is used strictly as an indexing component for lookup (per GF 0011–2009 / GB 13000.1). Key refers to a semantic component¹ only when it functions inside a character as meaning-bearing structure (i.e., a subtype of *bùjiàn* 部件). *Bùjiàn* 部件 denotes functional components within a character and is partitioned into semantic, phonetic, and neutral (structural carriers). *Piānpáng* 偏旁 is retained for historical/traditional descriptions and orthographic positions but is not used as an analytical category in the proposed pedagogy.

¹ The term *semantic component* refers to a graphic subunit within a Chinese character that contributes meaning at the orthographic level (e.g., 氵 in 河), and is therefore a category of functional graphemic analysis within character composition. By contrast, *semantic constituent* denotes a meaning-bearing linguistic unit—typically a morpheme or conceptual element—identified through semantic or morpho-syntactic analysis (e.g. in the word 河水, both 河 and 水 function as semantic constituents contributing to the compound's overall meaning). Thus, while the former pertains to character-internal structure, the latter operates at the lexical or sentential level, describing how meaning is compositionally organized in language rather than inscribed in graphic form.

Term (Chinese with pinyin)	Term (English)	Primary function in this paper	Typical examples	Notes
部首 bùshǒu	indexing component (lookup key)	Dictionary/ index macro- organization for retrieval	氵 as the indexing key for 河/湖; 忄 for 怕/情	Standardized by GF 0011–2009; used for lookup, not analysis
部件 bùjiàn	functional component	Micro-structure inside charac- ters; classified as semantic / phonetic / neutral	氵 (semantic) in 河; 可 (phonetic) in 河; 冫 (neutral) in 写	Core analytical unit for teaching/ learning
语义部件 (部件·义) yǔyì bùjiàn (bùjiàn·yì)	semantic component (key in function)	Constrains meaning/ domain	扌 ‘hand/ action,’ 钅 ‘metal,’ 艹 ‘plant’	Use when the part carries meaning in situ
声旁 (部件·声) shēngpáng (bùjiàn·shēng)	phonetic component	Cues syllable/ phonotactics	可, 青, 马, 兑, 争	Report regular- ity (exact, tone shift, onset/final similarity)
中性/结构部件 zhōngxìng/ jiégòu bùjiàn	neutral/ structural carrier	Layout/ortho- graphic frame; low semantic/ phonetic content	冫, 亅 (when purely posi- tional), 久, 攵 (in some modern forms)	Teach as forms that stabilize layout patterns or simplification residue
偏旁 piānpáng	“side component” (positional label)	Historical/ positional term (left/right/top/ bottom)	氵 (three dot water side), 忄 (standing heart side)	Use only for historical descrip- tion/position, not analysis

Table 1. Terminology policy used in this paper

RQ1: How should *bùshǒu* 部首 (key indexing components) be situated vis-à-vis functional components *bùjiàn* 部件 to optimize L2 character learning?

RQ2: Which explicit decision rules for semantic/phonetic/neutral components most improve mnemonic quality and transfer to unseen characters?

RQ3: What syllabus structure allows principled use of *bùshǒu* 部首 for lookup while teaching analysis primarily at the *bùjiàn* 部件 level?

2. Development of Chinese Writing: Toward the Bushou System

The Chinese script ranks among the world's oldest writing systems, yet its unique morphosyllabic structure presents significant acquisition challenges for L2 learners. Scholarly debate persists on what constitutes as writing, with definitions ranging from narrow (Boone & Mignolo 1994; Coulmas 1992; DeFrancis 1989) to broad (Haas 1976; Harris 1995; Urton 2003):

- Restrictive view: “True writing” requires phonograms (alphabetic, syllabic, or logosyllabic systems like cuneiform).
- Expansive view: Includes non-phonological semiotic systems (e.g., Andean textile patterns ², mathematical notations or even dance). ³

Urton refines this as: “*communication of specific ideas through permanent, conventionalized visible signs.*” ⁴

For Chinese specifically, Dematté establishes four criteria to distinguish ancestral scripts from non-writing Neolithic symbols:

1. Intentionality: Distinctive shapes with systematic use.
2. Developmental logic: Morphological links to Shang scripts (c. 14th–11th c. BCE).
3. Regional coherence: Expanding sign systems.
4. Socio-political context: Emergence in complex societies. ⁵

While Neolithic pottery fragments show character-like marks, the first fully developed Chinese writing appears in Shang oracle bone inscriptions (OBI). These often-called pictographs or more precisely iconic characters initially depicted concrete objects (e.g., *rì* 日 ‘sun’, *yuè* 月 ‘moon’) but underwent three key evolutionary phases:

1. Abstraction: Pictorial or iconic forms simplified, losing iconic clarity (e.g., OBI 馬 → modern 马 ‘horse’).
2. Rebus adaptation: Graphs borrowed phonetically for homophones (e.g., *lái* 來 ‘wheat’ → ‘to come’).
3. Phonetic compounding: Semantic + phonetic components merged (e.g., *hé* 河 ‘river’ = 氵 ‘water’ + *kě* 可 [sound value]). ⁶

Boltz frames this progression into four universal writing stages:

1. Logographs: One symbol = one word.

² Arnold–Yapita 2000: 46–49.

³ Boone 1994: 15–17.

⁴ Urton 2003: 26–27.

⁵ Dematté 2010: 212–3.

⁶ Norman 1988: 58–62; Boltz 1986: 420–421; Boltz 1994: 31; Dematté 1999: 241, Dematté 2010: 211; Qiu 2000: 29.

2. Graphic multivalence: Rebuses enable homophone representation.
3. Determinatives: Secondary components resolve ambiguity.
4. Phoneticization: Full sound-based writing (unreached by Chinese).⁷

3. Bushou or Keys as a Determinative Innovation

Chinese script stabilized at Stage 3, where *bushou* emerged as systematic determinatives. These semantic keys (e.g., *shuǐ* 水 ‘water’ as a key in *hé* 河 ‘river’ and *hú* 湖 ‘lake’) disambiguated meaning while preserving the script’s morphophonemic nature. This lexicographical development, formalized later in the *Shuōwén jiězì* 说文解字 (SW), compiled by *Xǔ Shèn* 许慎 around 100 CE,⁸ established the foundation for character organization, retrieval, and pedagogy. SW organized under 540 keys (of which 36 remained empty), it comprises 9353 characters, along with 1163 graphic variants.⁹ These keys, often also called classifiers, head graphs or even sometimes division heads, are the Chinese characters that have been selected and deliberately put to the beginning of each sub-chapter creating groups of characters according to Xu Shen’s zeitgeist view on cosmological matters. In many cases characters visually include a certain key element, but they are not subsumed under the obvious key due to the above-mentioned cosmological views or some other visual similarity juxtaposition reasons. Xu Shen utilized 540 distinct keys to group characters, thereby establishing a comprehensive system that enabled a detailed exploration of the script’s graphic etymology. It is postulated that the number of keys is a product of Xu Shen and his times’ cosmological view of the five elements and their use of mapping how the world works. By multiplying the symbolic fully yin and yang numbers 6 and 9, he arrives to the number 54. This number probably was not a sufficient number for keys to list the roughly ten thousand characters, so he multiplied 54 by 10 and came to a conclusion of the number 540.¹⁰

Although the SW is often interpreted as a conventional dictionary, Xu Shen’s focus was not on providing a lexicon of word meanings and pronunciations. Instead, the work is best understood as an exposition on the origins and structure of Chinese characters through their graphical elements. Xu Shen’s emphasis on the graphic roots of characters, rather than on their use in contemporary language, reflects his intention to elucidate the formation and classification of

⁷ Packard 1996: 801–804.

⁸ Although it was written around 100 CE, it was only submitted to the court on October 19, 121CE. For details on the date see O’Neill 2016: 236.

⁹ Bottéro 2002: 20–21; Bottéro–Harbsmeier 2008: 257; Serruys 1984: 655.

¹⁰ Atsugi Tetsuji 1985: 135–172.

characters as symbolic representations. As Professor Imre Galambos notes, this preoccupation with graphic and etymological structure rather than with semantics differentiates the SW from modern lexicographical works, which prioritize meanings and pronunciations over etymological analysis.¹¹

One of the unique aspects of the SW is its byproduct functionality for character retrieval. Although Xu Shen's primary objective was not to create an efficient character lookup system, the structure of the *bushou* arrangement inadvertently served this purpose. Each character was classified under a key that denoted its visual and semantic components, making it easier to locate characters based on their shared features. This unintentional consequence of Xu Shen's organizational strategy had profound implications for the future development of Chinese lexicography, as it influenced the key indexing systems in later dictionaries, such as the *Kāngxī Zìdiǎn* 康熙字典 (1716 CE).¹²

4. The *Liù Shū* 六书 Classification: Theoretical Framework and Pedagogical Applications

Complementing the *bushou* system, as described in the postface of the SW, the *Liù Shū* 六书 framework categorizes character formation into six principles:

1. Zhǐshì 指事 indexical or indicative characters: Abstract concepts via symbolic marks (e.g., *shàng* 上 'above', *xià* 下 'below').
2. Xiàngxíng 象形 iconic characters (often also called pictographic)¹³: Concrete object depictions (e.g., *rì* 日 'sun', *yuè* 月 'moon').
3. Xíngshēng 形聲 phonetic-semantic compounds: Semantic key + phonetic component (e.g., *hé* 河 'river', consisting of 氵 'water' key + *kě* 可 as base phonetic value).
4. Huìyì 會意 "combined intentions" or meaning combination characters (or also called ideographic compounds): Meaning synthesis (e.g., *wǔ* 武 'military', consisting of *zhǐ* 止 'foot' + *gē* 戈 'dagger-axe').
5. Zhuǎnzhu 轉注 mutually explanatory characters (or rotated characters): Semantic variant pairs (e.g., *kǎo* 考 'old' (later extended 'to examine') ↔ *lǎo* 老 'old').

¹¹ Galambos 2006: 33–61.

¹² Galambos 2006: 33–61.

¹³ Pictographic in general English refers to any visual sign representing an object through a picture. Iconic in semiotics is broader, any sign (visual, auditory, tactile) that resembles its referent. In early Chinese script studies, pictographic became the default translation for *xiàngxíng* 象形, even when the resemblance was stylized and symbolic (no longer a literal picture). Modern scholars sometimes prefer the word iconic because it works both for literal pictographs and for later stylized forms whose resemblance is conceptual rather than photographic.

6. Jiǎjiè 假借 phonetic loan characters: borrowed characters representing homophonous words lacking dedicated graphs (e.g., *lìng* 令 ‘command’ ← onomatopoeia for bells, later ‘bell’ written with a metal key determinative [钅 or 金 as in its traditional form 鈴] *líng* 铃).

The Liu Shu represents the earliest systematic theory of Chinese character construction and lays the foundation for theoretical functional taxonomy. Besides providing a systematic theory for character construction it also provides pedagogical utility. While iconic characters (e.g., *lù* 鹿 deer) and indicative characters (e.g., *rèn* 刃, where the dot 丶 marks the blade’s edge) aid conceptual visualization as a mnemonic device, on the other hand phono-semantic characters take dominance as they provide 82% of SW characters (7697 entries) and require a different approach. 2305 of the most commonly used 3500 high-frequency characters are phono-semantic, which accounts for 65.9%. Where learners, beside the semantic component, also have to analyse the phonetic component in each character. Of these characters 32.5% have phonetic components with identical pronunciation to the full character, 16.8% differ only in tone. Additionally, 15.7% have similar initials and the same final.

This method conveys inferential power, where learners deduce meaning and sound via components. By leveraging these features, teachers can help students cultivate the ability to make educated guesses about the sound and meaning of unfamiliar characters.¹⁴

4.1. Limitations of the Liu Shu

Although the Liu Shu framework possesses great historical and linguistical significance, but it also has its limitations. Ambiguous categorization is one of the biggest of its limitations, where the boundaries between category types overlap (e.g., indicative- vs. iconic characters). Another great insufficiency is the inconsistent SW labelling (e.g., *dà* 大 ‘big’ debated both as iconic and as indicative character). Modern Chinese language shows a high level of homophony, yet the Liu Shu does not adequately address how characters distinguish phonemes, a function that is more effectively handled by phonetic-semantic compounds. These phonological gaps, as in sound shifts since Old Chinese, reduce phonetic reliability with only 49.3% accuracy. Ignores modern homophony disambiguation (e.g., *gē* 鸽 ‘pigeon’ vs. *jī* 鸡 ‘chicken’), thus creating more modern pedagogical challenges. Scholars have many times debated the *zhǐshì*

¹⁴ Bian 2024: 789–793.

指事 controversy, whether characters like *yī* 一 ‘one’ and *xiōng* 凶 ‘ominous’ are purely symbolic or retain iconic elements, blurring lines with iconic characters. *Táng Lán* 唐蘭 argued that *zhǐshì* was a «catch-all» for unclassifiable characters. Taxonomic flaws also exist in the Liu Shu framework as *zhuǎnzhù* 轉注 and *jiǎjiè* 假借 represent usage principles, not character creation methods. The above-mentioned border crossing problems and misunderstandings create pedagogical barriers, where retroactive classification risks misinterpretation, moreover abstract compounds (e.g., *huìyì* 會意) increase cognitive load for L2 learners.^{15 16}

As O’Neill puts it: “*This liushu ‘six ways of writing’ is not described in the Shuowen Postface as a set of graphemic analytical principles (which it became later in the lexicographic tradition, and was often used to anachronistically interpret the microstructures of the Shuowen), but rather as a pedagogical tool used to teach raw illiterate children how to even begin to approach guwen [characters] so as to learn how to write from the ground up.*”¹⁷

In conclusion, the Liu Shu remains a foundational framework, offering the macrostructure for understanding Chinese character formation and providing a conceptual scaffold for pedagogy. However, its category boundaries and phonological treatment require refinement. For practical teaching and detailed analysis, the *bushou* system and other component-based approaches supply the microstructure, enabling more precise mnemonic and functional insights. The Liu Shu could continue to serve as a secondary, complementary tool if updated well, for instance, by subdividing phono-semantic characters into two types and redefining *huiyi* characters as semantic–semantic forms. This would allow a mathematically clearer typology of three primary categories: SS (semantic–semantic), PS (phono–semantic), and PSS (phono–semantic where the phonetic element also carries semantic information).

5. Road to Standardization and Adaptation

The earliest Chinese writing emerged not merely as a tool for communication but as a visual system deeply rooted in the cultural, ritual, and cosmological context of its time. Understanding its formative principles: pictographic, iconic, and symbolic, later with the emergence of phonetic components, provides a

¹⁵ Bo 2012: 160–163.; Chen 2018: 90–93; Dai 2013: 4–5.; Galambos 2006: 33–61; Li 2009: 19–20; Tang 1948: 67–74; Zhang 1997: 30–35.; Zhou 1988A: 262.

¹⁶ For more detailed problems within individual *liushū* 六书 categories (notably the ambiguously defined *zhuǎnzhù* 轉注) and traditional/modern approaches to them, see Qiu 2000: 153–163.

¹⁷ O’Neill 2016: 261.

foundation for interpreting the structural logic that later shaped lexicographical systems such as the SW.

The key classification, or *bùshǒu* 部首, system introduced in the SW established a structural paradigm that exerted a profound and lasting influence on Chinese lexicography and character studies. Xu Shen's arrangement of characters according to shared graphical and semantic components created the first systematic key-based framework, which became a foundational model for subsequent reference works. Later dictionaries, most notably the *Kāngxī Zìdiǎn* 康熙字典, refined and expanded the *bushou* system, adapting it to the evolving needs of language users while retaining the essential structural logic of the SW. Over the centuries, this key-based categorization not only shaped the organization of lexicographical resources but also permeated educational practice, influencing how Chinese characters were taught, memorized, and analysed. Pedagogically, the SW's arrangement provided an implicit method for decomposing complex characters into smaller, semantically or phonetically meaningful units. This aligns with modern second language acquisition principles, which emphasize the importance of breaking down complex linguistic forms into accessible, interpretable components. While Xu Shen's primary intent was etymological rather than instructional, the resultant retrieval functionality, grouping characters under shared keys, offered a practical reference tool that facilitated both scholarly research and classroom application. However, the SW's classification reflects the priorities of its historical context rather than those of modern learners. Its emphasis on etymology, while invaluable for historical linguistics, leaves pedagogical gaps when applied to contemporary character instruction.¹⁸

5.1. Historical changes in the bushou system

As detailed in Chapter 3, the *Shuowen Jiezi* initiated a key component-based classification system with 540 indexing key components (*bushou*) organizing 9353 characters and 1163 variants across 14 chapters. This arrangement prioritized cosmological principles and visual similarity over natural semantic categories, enabling unprecedented retrieval functionality. Although 36 components remained empty, Xu Shen's focus on graphic analysis, and formalization of terms such as *bùjū* 部居 (key-component grouping) and *liùshū* 六書 (six principles of character formation), established enduring lexicographical conventions.

Over subsequent centuries, this framework was refined:

¹⁸ Bottéro 2002: 20; Bottéro–Harbsmeier 2008: 257–258; Galambos 2006: 33–61.

- The *Shímíng* 釋名 (c. 200 CE) adopted thematic categorization into 27 object-based groups (8 scrolls), using rhyming glosses to explicate etymologies.¹⁹
- The *Zilín* 字林 (Jin 晉 dynasty 265–420 CE) retained the 540 bushou system for 12824 characters.²⁰
- The *Yùpiān* 玉篇 (543 CE) expanded to 16917 characters under 542 keys, arranging them primarily by semantic criteria rather than visual similarity.²¹
- The *Lèipiān* 類篇 (1067 CE) preserved the 540 key structure but expanded to 31319 entries, integrating Tang–Song innovations and employing *fǎnqiè* 反切 spellings with semantic glosses.²²

A major shift came with the *Wǔyīn Lèijù Sishēng Piānhǎi* 五音类聚四聲篇海 (1190–1208 CE). Han Xiaoyan increased keys to 579 by incorporating material from multiple sources and aligning classification with the 36 initials (*zìmǔ* 字母), bridging the *Qièyùn* 切韻 phonological tradition and practical retrieval. Recognizing inefficiencies, Han Daozhao’s 1208 CE revision reduced the count to 444 and introduced stroke-based sub-sorting, foreshadowing later mechanical indexing systems.²³

The Ming-era *Zihuì* 字彙 (1615 CE) marked a decisive simplification: key components were reduced to 214, organized by ascending stroke count, with entries indexed by the remaining constituent’s strokes after removing the key. This dual key–stroke-order system, covering 33179 entries, set the organizational template for later dictionaries, including the *Zhèngzìtōng* 正字通 (1671 CE) and the Qing *Kāngxī Zìdiǎn* 康熙字典 (1716 CE).²⁴

The *Kangxi Zidian*, imperial China’s largest dictionary, codified the 214 bushou system, formally fixing the term *bùshǒu* 部首 as one word and the standard designation for semantic keys. Its 47043 entries (including 20000 variants) were arranged by key and stroke count, providing phonological data (*fǎnqiè* 反切 and *zhíyīn* 直音) alongside definitions sourced from canonical texts, with notes on alternative readings and forms. Supplementary sections aided rhyme classification (*Zìmǔ Qièyùn Yàofǎ* 字母切韻要法), key identification (*Jiǎnzì* 檢字), and graphic differentiation (*Biànsì* 辨似). Despite its authority, errors necessitated later critical supplements such as Wáng Yǐnzhī’s *Zìdiǎn Kǎozhèng*

¹⁹ Miller in Loewe 1993: 424–428.

²⁰ Dong 2018: 71–76.

²¹ Zhang–Zhang 2011: 45–47.

²² Liu–Shi 2016: 70–75; Yang 2007: 78–84; Yang 2013: 112–120.

²³ Han [1467] 2002: 248.; Zhou 1986: 104.

²⁴ Li–Lü 1996: 746; Wang 2013: 37–38; Wang 2018: 61–64; Zhou 1988B: 551.

字典考證 and Watanabe Atsushi's *Kāngxī Zidiǎn Kǎoyì Zhèngwù* 康熙字典考異正誤.²⁵

Across this evolution, the lexicographical trajectory moved from a cosmologically framed, etymologically driven bushou model in SW, through expansions and phonetic–semantic hybrids, toward the streamlined 214 bushou standard. These refinements progressively balanced etymological depth with practical retrieval, laying the groundwork for modern Chinese lexicography.

5.2. Modern changes in the bushou system

Modern China shifted keys from heritage-based catalogues to utility-first, standardized indexing, steadily reducing key indexing counts and formalizing how components are used. Legally this moved through the 1956 Han Character Simplification Scheme, the 1964/1986 General Table of Simplified Characters, the 2000 Law on the Standard Spoken and Written Chinese Language, and culminated in 2009 with GF 0011-2009 *Hànzì bùshǒu biǎo* 汉字部首表 (201 principal indexing components + 100 associated indexing components) and GB 13000.1 (key assignment rules) that standardize education, lexicography, and information processing.²⁶

After 1949, the PRC reshaped the *bùshǒu* 部首 system through three linked phases: targeted simplification (1950s), standardization (post-1978), and legalization (since 2000), hence recasting keys from a purely bibliographic device into a standardized, pedagogically useful component system aligned with simplified orthography. The decisive turn came with the Chinese Character Simplification Scheme in 1956, which not only simplified hundreds of characters but also, crucially, put 54 keys on a trial simplification list, aligning keys (e.g., 言 → 讠, 心 → 忄, 水 → 氵, 貝 → 贝, 車 → 车) with the script actually taught in schools and used in publishing. Because key lookup depends on key shape + residual stroke count, these shape changes redistributed entries across key tables and nudged pedagogy toward new, uniform routines.²⁷

Following the disruptions of the Cultural Revolution, and the aborted “Second Simplification” in 1977, formally rescinded only in 1986, language planning pivoted from sweeping reform to *Guīfàn huà* / *biāozhǔn huà* 规范化/标准化 normalization/standardization. In practice this stabilized key assignments and stroke-count rules, reduced local dictionary idiosyncrasies, and embedded keys

²⁵ Chen 1991: 147–155; Feng 1988: 72–80.; Wilkinson 2022: 147; Qu 2006: 53–56.

²⁶ GF 0011-2009 *Hànzì bùshǒu biǎo* 汉字部首表; GB13000.1-93 *Zìfújí Hànzì Bùshǒu Guībù Guīfàn* 字符集汉字部首归部规范

²⁷ Su 2009: 26–35.

within a multi-index ecology alongside Hanyu Pinyin and later digital search, which increasingly handled known-pronunciation lookup while keys remained vital for unknown readings and morphological awareness.²⁸

Since 2001, the National Common Language and Script Law has legally anchored Putonghua and standardized (simplified) characters while permitting traditional/variant use in regulated domains, consolidating simplified indexing keys in education, examinations, and publishing under a policy of “subjectivity with diversity” (a single national standard plus protected plurality). As a net effect the post 1949 reforms did not discard the key method, on the other hand they standardized and simplified it, and repositioned bushou as a core tool for structure-aware literacy that works with pinyin and digital retrieval to support contemporary character learning.²⁹

5.3. Modern changes, adaptations and limitations in L2 materials

As Chen notes, inconsistencies exist across modern Chinese textbooks in defining key structural concepts, such as *bùshǒu* 部首 (key semantic component), *piānpáng* 偏旁 (character component, which may be either *yìfú* 意符 or *xíngfú* / *xíngpáng* 形符/形旁 semantic component, or *shēngfú* / *shēngpáng* 声符/声旁 phonetic component), and *bùjiàn* 部件 (subcomponent, i.e., stroke groups forming meaningful shapes), create ambiguity for learners. The lack of standardization in these terms reduces pedagogical clarity and risks undermining systematic character acquisition. Chen’s work advocates for precise differentiation among these structural units, positioning bujian as the most adaptable and learner-centred analytic level, moreover recommends teaching bushou purely for lexicographical use (for dictionary lookup); use bujian for structural analysis of characters; limit pianpang to historical contexts. Chen prioritizes functional components and focuses on semantic and phonetic bujian (e.g., 钅 metal [semantic component]³⁰ in *qián* 钱 vs. *jiān* 戔 [phonetic component]). Chen also acknowledges limitations that need to be revised, e.g. the lack of framework for some bujian as neutral building blocks in certain characters that are neither semantic-, neither phonetic components, yet still contribute to learning and deciphering the character. Another problem is misalignment with modern characters as the traditional pianpang or bushou framework fail to account for modern simplified characters, as now many of them include non-semantic and non-phonetic elements (e.g., 丨 in *jiù* 旧[舊], 又 in *hàn* 汉[漢]). In contem-

²⁸ Chen 2005: 2–11.

²⁹ Chen 2005: 2–11; Su 2009: 26–35; Zhou 2013: 32–44.

³⁰ Note that here the metal key is both a semantic component and an indexing component.

porary dictionaries such as the *Xīnhuá Zìdiǎn* 新华字典, certain bushou are selected primarily for graphic convenience (e.g., 丿) rather than for conveying semantic value. While this facilitates rapid lookup, it can limit the etymological transparency and mnemonic usefulness of the system for learners. Limitations include unstable historical etymologies, simplified forms with non-semantic residues, and inconsistent textbook conventions.³¹

6. Effectiveness of component-based character acquisition

A growing body of research indicates that teaching Chinese characters through key components, including both semantic- and phonetic keys, offers a principled route to orthographic learning for second-language (L2) learners. Studies consistently show that when instruction draws learners' attention to recurring keys and their positional, phonological, and semantic regularities, learners encode characters more efficiently and remember them longer than under whole-character, rote approaches. Shen and Ke's widely cited work framed this problem by distinguishing keys from mere perceptual chunks and demonstrating that adult L2 learners' ability to apply key knowledge relates to vocabulary retention, an early argument that component awareness is not ancillary but central to learning to read Chinese as an L2.³²

Another interesting approach is grouping by shared keys, which also helps beginners. In an instructional experiment that taught 48 characters organized into eight key-based groups, Xu, Chang, and Perfetti found that beginning university learners who studied characters grouped by a shared semantic key outperformed peers who learned the same items in a distributed order. Benefits emerged across character form, sound, and meaning at post-test and persisted two weeks later. Beginning learners also showed stronger development of semantic key awareness than in the distributed condition. Notably, the same manipulation did not yield significant gains for intermediate learners, suggesting a proficiency interaction. The authors interpret the grouping advantage as "deeper processing" that helps novices notice the key's shape, position, and category cue across exemplars, and differentiate overlapping forms, sounds and meanings.³³

Naturally an isolated experiment is different from a real University classroom curriculum experience, where students learn much more characters and words. In vivo classroom evidence favours visual chunking under grouped sequencing. Extending this logic into real classrooms, Chang, Xu, Perfetti and colleagues

³¹ Chen 2015: 44–50.

³² Shen–Ke 2007: 97–111.

³³ Xu et al. 2014: 773–793.

compared grouped versus distributed character introduction and four encoding methods (handwriting, visual chunking, passive reading, stroke-reporting) with 48 first-semester students. Two findings stand out. First, grouped sequencing improved production (writing from memory) at delayed test, an ecologically meaningful outcome for classroom teachers. Second, visual chunking (an “exploded-diagram” attention to subparts) was the best encoding method under the grouped condition, consistently outperforming handwriting, passive reading, and stroke-reporting in post-test production. The authors stress that the classroom’s tight time budget (≈ 30 seconds per character) likely explains why traditional handwriting advantages, robust in lab studies with minutes of practice, were small here; scoring analyses further showed that layout- and stroke-level scores were most sensitive to novices’ emerging orthographic representations.³⁴

Repetition of keys promotes abstraction, but can transiently harm exact meaning recall. In a training study with 36 one-character words taught to 30 Dutch beginners, Takashima and Verhoeven showed that repeated exposure to the same phonetic or semantic keys across different characters accelerated learners’ understanding of those keys and improved transfer to untrained items. However, there was an asymmetry: repeating phonetic keys aided pronunciation of trained characters, whereas repeating semantic keys sometimes hindered retrieval of the exact meanings (learners confounded items within the same semantic category). The authors interpret this as a *cue-overload effect* at early stages, keys serve as retrieval cues, but when character representations are weak, shared semantic cues can cause interference; over time, with stronger character memories, this cost should diminish.³⁵

Key-derived e-learning raises orthographic awareness. In a larger quasi-experiment ($N=129$) using a key-derived e-learning platform over three weeks, Chen and colleagues reported significant gains over a traditional word-based comparison group on phonetic-key awareness, semantic-key awareness, and general orthographic knowledge. The platform integrated stroke animations, etymological illustrations, and explicit focus on keys; learners studied at least seven keys per week with their derivatives. Although the sample included many heritage learners (a limitation for generalizing to typical L2 novices), the design demonstrates that explicit key-oriented instruction can scale beyond small lab cohorts.³⁶

Key sensitivity predicts reading. Converging evidence comes from processing studies showing that adult L2 learners encode positional (orthographic), semantic, and phonological information about keys and that this key sensitivity

³⁴ Chang et al. 2014: 288–305.

³⁵ Atsuko – Verhoeven 2019: 71–81.

³⁶ Chen et al. 2013: 89–106.

uniquely predicts Chinese word reading even after controlling for time spent learning the language. Learners showed a bias to semantic keys when no cue was provided, switched to phonetic keys when sound cues were present, and were more accurate when keys appeared in their canonical positions, mirroring native-reader patterns and underscoring keys' functional status in the L2 lexicon.³⁷

What works. Across these studies, several pedagogical levers are supported:

- Grouping by shared keys (for beginners) improves later recall and promotes autonomous generalization of key knowledge.³⁸
- Visual chunking that foregrounds component structure is especially effective when paired with grouped sequencing in authentic classrooms.³⁹
- Repetition of phonetic keys strengthens orthography → phonology mappings and pronunciation.⁴⁰
- Explicit, key-derived platforms can boost both semantic- and phonetic-key awareness in short courses.⁴¹

What doesn't (or not yet). These same sources also caution against overinterpreting some techniques:

- Semantic-key repetition can *temporarily* depress exact meaning recall early on, likely through cue overload among near neighbours; designers should mitigate by spacing semantically close items or adding disambiguating context and examples.⁴²
- Stroke animations and other visual embellishments do not consistently translate into stronger character → meaning or character → pronunciation links under classroom time constraints; without sufficient practice, handwriting advantages also shrink.⁴³
- Colour-coding Chinese character components helps only when it is integrated into a single, coherent visual that conveys a key's meaning and typical position, reducing extraneous load, whereas colour marking keys and stroke-order animations harmed immediate recognition accuracy and speed vs. controls, likely via added cognitive load. A design-led study argues that cohesive, function-bearing visuals (not decorative overlays)

³⁷ Tong et al 2015: 159–181.

³⁸ Xu et al. 2014: 773–793.

³⁹ Chang et al. 2014: 288–305.

⁴⁰ Atsuko – Verhoeven 2019: 71–81.

⁴¹ Chen et al. 2013: 89–106.

⁴² Atsuko – Verhoeven 2019: 71–81.

⁴³ Chang et al. 2014: 288–305.

aid beginners, consistent with the caution against superficial colour markings.⁴⁴

All samples are beginner adult L2 learners and use small key sets, so scaling to large vocabularies or advanced learners is uncertain.

6.1. Limitations across the literature

First, sample sizes are modest (e.g., ≈ 48 in the in-class study; ≈ 30 in the key-repetition training; ≈ 129 in the e-learning quasi-experiment, many of whom were heritage learners), limiting precision and generalizability by proficiency profile. Second, materials are narrow relative to a university curriculum: studies typically used 8 semantic keys with 48 characters or 36 items, useful for mechanism testing, but far short of the hundreds of keys and thousands of characters learners must command for HSK bands. Third, durations are brief (often three weeks, or two-week delays), so long-term retention and transfer to extensive reading remain open. Fourth, ecological constraints matter: the handwriting advantage documented in labs with ~ 6 minutes per character largely disappeared when classrooms allowed ~ 30 seconds, underscoring that method efficacy is conditional on time-on-task.

The through-line across these studies is clear: *keys organize memory*. When instruction systematically surfaces the recurrent building blocks of characters, what they look like, where they sit, what they tend to mean, and for phonetic keys how they tend to sound, beginners learn faster and retain more robustly. Classroom-realistic implementations that combine grouped sequencing with visual chunking show particular promise; careful control of semantic neighbourhoods should prevent early interference.

Integrating this refined componential approach with the macrostructural⁴⁵ legacy of the bushou system offers a pathway toward a more coherent and pedagogically effective methodology for teaching Chinese characters in the modern L2 context.

⁴⁴ Tian et al. 2020: 572–585; Hou–Jiang 2022: 783613.

⁴⁵ Macrostructural compared to *bujian*, but microstructural compared to *liu shu*.

7. Advised reforms and future research

7.1. Brief methodological note on complexity and transparency

Component complexity and semantic transparency. In sequencing instruction, I treat learnability as a function of two measurable attributes: a Component Complexity Index (CCI) and a Semantic Transparency Rating (STR). CCI combines (a) stroke count (normalized), (b) visual confusability (membership in near-shape sets, e.g., 彡 ~ 彡 ; 丩 ~ 丩), and (c) positional regularity (lower entropy = more regular positions, e.g., 彡 left, 彡 bottom). STR is a 0–2 scale capturing how directly a semantic component constrains meaning in its family: 2 = transparent (氵 → liquids/water: 河、湖), 1 = partial/metonymic (扌 → actions by hand: 把、找), 0 = opaque/conventionalized (疒 in 病 for “illness” may be transparent to some, opaque to novices). Consistent with the evidence summarized in §6, I propose ordering practice by (STR↓, CCI↑, frequency↓)—start with high-transparency, low-complexity, high-frequency families; defer low-transparency or high-confusability sets to later cycles and surround them with disambiguating contexts to minimize early cue-overload. Phonetic components are concurrently ranked by regularity (exact > tone-shift > rime/onset similarity), enabling a dual ladder: semantic salience for meaning inferences and phonetic regularity for pronunciation prediction. This principled staging links component complexity directly to cognitive load while making semantic transparency an explicit, testable lever for character learning.

7.2. A Modernized Soothillian Program: Frequency-Ordered Phonetic Families Cross-Indexed to Keys

Confronting the often-characterized Herculean challenge of the Chinese script in L2 pedagogy invites a consideration of two poles. At one extreme, a radical phonocentric reform, associated with DeFrancis’s arguments⁴⁶, would effectively supersede the morphosyllabic script with alphabetic transparency. At the other, a conservative Confucian stance of *shù ér bù zuò* 述而不作 as ‘to transmit rather than create’, counsels disciplined refinement of inherited analyses, from Xu Shen’s *Shuowen jiezi* to Soothill’s 1908 *Student’s Four Thousand Tzu and General Pocket Dictionary*, which operationalized approximately 895 phonetic series as a learner-oriented syllabary. The former promises processing efficiency but risks erasing the dense morphemic and cultural information

⁴⁶ DeFrancis 1984: 195–203.

encoded in graphs; the latter preserves that informational richness while making it instructionally tractable through systematic componential organization. A pragmatic resolution is neither abolition nor antiquarianism, but a modernized Soothillian program: a frequency-ordered syllabary of phonetic families, cross-indexed to keys and other components, that functions as a surrogate graphemic code for instruction. Such a curriculum honours the Confucian ethic of transmission while directly addressing L2 learnability, transforming the script from an obstacle into a structured, generative resource for decoding, retention, and higher-order lexical conceptualization.

Character-component analysis has an established record in L2 Chinese: explicit instruction in keys, phonetic components, and recurring frames measurably improves decoding speed, pronunciation prediction, and retention by converting opaque graphs into learnable subunits. Much like an engineer's exploded-diagram view, this pedagogy renders each character as a labelled assembly of parts with discernible functions (semantic, phonetic, structural), enabling learners to generalize beyond item-by-item memorization. Given this demonstrated efficacy, the logical next step is not to abandon the approach but to systematize it: curate a frequency-ordered inventory of semantic, phonetic, and neutral components that jointly generate the most commonly used character set (e.g., the full HSK core). Each component should be annotated with consistency metrics (sound regularity, semantic transparency), common allographs, and high-yield families, then sequenced from high-consistency to low in order to manage cognitive load. Interleaving family-based reading drills with composition tasks (build-from-parts) would consolidate prior gains while providing a scalable, generative pathway to writing and recognition.

The strategic pedagogical distinction between the *shǔzì* 属字 method, which groups characters by shared structural units like semantics or phonetics, and the *zìzú* 字族 method, a broader aspect, which clusters them by common etymological roots, represents a critical evolution in the orthographic acquisition of Chinese as a second language (L2). The primary importance of this dual approach lies in its capacity to address both the functional and profundity requirements of learning a morphosyllabic, componentially structured script. The 属字 method offers considerable efficacy in initial vocabulary building; by teaching characters in groups like *hé* 河, *hé* 何, and *gē* 哥 as a phonetic series based on *kě* 可, it empowers learners with a powerful decoding heuristic for approximating pronunciation, thereby accelerating reading fluency and reducing the cognitive load of treating each character as a unique entity. However, this method's significant limitation is the notorious unreliability of phonetic components in modern Mandarin, often leading to fossilized pronunciation errors, as seen with a character like *qí* 奇 in the same series. Conversely, the *zìzú* 字族 approach, by uniting

characters like *zhí* 执 ‘to hold’, *shì* 势 ‘power’, and *shú* 熟 ‘ripe’ through their ancient root *jǐ* 𠂔 ‘to hold’, facilitates deep, semantic encoding; while differentiating from the characters indexing key components (扌 [*shǒu* 手] ‘lifting hand’ key, 力 *lì* ‘power’ or ‘strength’ and 火 [*huǒ* 火] ‘fire’ respectively). This moves learning beyond rote memorization by constructing a narrative of meaning, dramatically enhancing long-term retention and disambiguating conceptually related but structurally distinct characters. Its principal drawback is its inaccessibility to beginners, requiring a foundational knowledge of palaeography and historical phonology that is often impractical in introductory curricula. So here the question is when is the right time and in what depth appropriate to introduce these linguistic terms and differences. Ultimately, the paramount importance of integrating both methods lies in their complementary nature: *shuzi* provides the scalable, functional toolkit for breadth, while *zizu* offers the connective, mnemonic depth necessary for advanced mastery and accurate lexical conceptualization.

Building upon this complementary framework, a paramount future pedagogical reform would involve the systematic development of a standardized, component-based syllabus—a modern successor to the foundational work of scholar Soothill. Given the script’s non-alphabetic nature, such a syllabus must transcend the traditional, often arbitrary, ordering of characters by stroke count or thematic lists. Instead, it would be constructed through a meticulous analysis that identifies a finite set of core semantic, phonetic, and neutral components, the fundamental “building blocks” of the script. This syllabus would explicitly map the functional roles of these *bujian*. The implementation of this method, while complex, would represent a significant evolution in pedagogical efficiency, offering a logical and empirically-grounded “roadmap” to mastering the Chinese writing system.

The author proposes a quasi-experiment as a next step at Eötvös Loránd Science University (ELTE in Budapest, Hungary). Given this evidence, a logically progressive study would embed a key-centric syllabus (grouped by shared semantic keys and aligned phonetic keys) into parallel sections of a real first-year ELTE Chinese program. Following Xu et al. and Chang et al., one arm would adopt grouped sequencing with visual chunking as the default encoding routine; the comparison arm would maintain the existing distributed syllabus. The component inventory should be substantially expanded (e.g., ≥ 150 high-utility keys covering the most frequent HSK characters), with principled control of semantic neighbourhoods to avoid early cue overload. Outcome measures should include (a) recognition and timed lexical decision on taught and untaught items, (b) production scored at *layout*, *stroke*, *chunk/key*, and *whole-character* levels, (c) transfer tests probing application of key knowledge to novel charac-

ters, and (d) course-embedded reading and vocabulary assessments. To mirror classroom realities, practice time per item should be recorded, and any embellishments (e.g., colour-coding) should be treated as factorial manipulations, not default features, since their incremental value has not been established in the extant studies.

8. Conclusion

This paper argues that L2 character instruction achieves the best learning yield when *bùshǒu* 部首 are treated as an indexing system, while analysis and teaching operate at the level of *bùjiàn* 部件 functional components, explicitly distinguishing semantic keys, phonetic keys, and structurally neutral carriers. Historically, the evolution from *Shuowen Jiezi*'s cosmologically inflected key catalogues to the streamlined *Kangxi* standard and, in the PRC, to legally codified indexing tables (GF 0011-2009; GB 13000.1) shows that key-based organization remains an indispensable macrostructure for retrieval and curricular coherence. Pedagogically, however, durable gains in recognition, pronunciation prediction, and transfer come from decomposition: teaching characters as assemblies of parts with consistent form–function mappings and presenting them in carefully curated families that make those consistencies salient while flagging irregularities.

Synthesizing historical lexicography, cognitive constraints, and empirical L2 findings, the author proposes a component-first syllabus that functions as a surrogate graphemic code for a non-alphabetic script. Concretely, this calls for (i) a frequency-ordered inventory of high-utility components covering the HSK core; (ii) decision rules that separate semantic, phonetic, and neutral roles; (iii) dual indexing that preserves bushou for lookup while teaching analysis by bujian; and (iv) task designs (visual chunking, family-based interleaving, guided production) that reduce cognitive load and promote generalization to untaught items. The approach acknowledges known limits—phonetic drift, semantic opacity in some simplified forms, conventional rather than “natural” key assignment (e.g., 丿 as indexing key)—yet these are best handled by transparent rule-setting and explicit exception handling, not by abandoning the componential method.

An alternative, or complementary, reform would be to design a parallel bujian-focused class running alongside the main communicative curriculum. Rather than reordering the textbook sequence, this course would introduce components systematically according to the HSK character lists at each level. For instance, an HSK 1 supplementary class could target the fifty most frequent semantic and phonetic components that generate the full Level 1 character set,

with higher levels progressively layering additional components in frequency order. This dual-track model preserves the integrity of the existing textbook syllabus while ensuring that learners simultaneously acquire the generative “building blocks” of the script, transforming HSK progression into both a lexical and a structural achievement.

To operationalize this reform, the syllabus must be anchored in transparent standards and aligned to the actual materials used in Hungarian L2 classrooms. Frequency data could be drawn from balanced corpora such as the Beijing Language and Culture University (BLCU) Corpus, the Lancaster Corpus of Mandarin Chinese (LCMC), and cross-checked against the official HSK frequency lists (Levels 1–6) to ensure international comparability. For the Hungarian context, this component inventory would then be mapped onto the sequence of the *New Practical Chinese Reader* (currently the dominant first-year textbook at ELTE), creating a concordance between textbook lessons and the proposed key-centric ordering. In practice, this means that when NPCR Lesson 3 introduces the character 同 (tóng, ‘together’), the syllabus would present it alongside its high-frequency family members (洞, 胴, 桐), annotated with phonetic regularity scores and semantic consistency notes. Each unit would thus combine (1) the textbook’s communicative goals, (2) the frequency-based component sequencing, and (3) targeted drills in both shuzi and zizu frameworks. The result is a step-by-step pathway: starting from high-frequency, high-consistency phonetic series and radical families, expanding progressively to lower-consistency sets, while retaining compatibility with the communicative syllabus already in use in Hungary.

Finally, the paper set out a quasi-experimental plan at ELTE to test ecological validity: scaling the component inventory toward realistic coverage, aligning assessment with classroom constraints, and measuring durable outcomes (retention, transfer, timed reading). Such a trial would move the field from laboratory demonstrations with narrow key sets to classroom-scale evidence in a European L2 context, providing the empirical footing needed to standardize component-based pedagogy across programs.

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