

A Model-based Online Framework for Kanji Learning

Dallas Nesbitt (dallas.nesbitt@aut.ac.nz)
Auckland University of Technology, New Zealand

Abstract

This article presents a conceptual CALL model of kanji learning set within a framework of outcome-specific learning tools and cognitive support. The kanji ‘package’, created by the author, will enable learners to manage the motivational issues, issues of methodology, and problems caused by lack of familiarity with orthographic scripts, that they inevitably encounter in their study of the challenging Japanese orthography. This article draws together aspects from the literature that contribute to the learning model. There are no examples in the literature of a framework for kanji learning. The article also discusses normalisation of technology to ground the framework in neo-Vygotskian principles of co-operative learning and early scaffolding. The kanji learning package facilitates learner understanding of the processes that lead to kanji mastery, and awareness of a wide range of learning tools. Learners, for example, who rely on repeated writing, will gain an understanding of the role rote learning plays in the full learning process and will be able to benefit from additional non textbook-based learning opportunities such as motivational games, co-operative tasks, and learning stratagems from peers. Framework-based CALL packages can potentially bring about a significant shift in learning methodology and encourage greater learner responsibility.

Keywords: Kanji, CALL, model-based learning, collaborative learning, , learning framework

INTRODUCTION

The expressions “Kanji Fear” (Kirwan, 2005, p. 22) and “The Kanji Barrier” (Bourke, 1996, p. 6) have not been coined lightly. Mastery of the Japanese government-prescribed 2,136 kanji and the two syllabic kana scripts alone are a formidable task. A close look at the many further complexities of kanji learning observed in tertiary-level kanji classes suggests it is time researchers consider how kanji learning can be managed to alleviate the difficulties.

In this article the author provides New Zealand tertiary-level learners of kanji with the means to improve kanji-learning outcomes efficiently through an online framework of learning. The framework is centred on a model of instructional strategies, each one matched with specific learning tools. The author’s research shows that difficulties with kanji learning cover affective and motivational issues, issues of methodology, diversity of learner backgrounds, and individual learner needs. Such diverse problems require the breadth of a full support framework designed to encourage learner autonomy and choice, and a core understanding of the steps and processes needed to learn kanji. The CALL framework of learning is presented in this article with discussion of the socio-cultural theoretical principles underpinning the concept. Current literature on kanji learning has focused mainly on learner strategy use and is yet to consider how using CALL to deliver model-based learning could alleviate many of the problems learners face in the kanji classroom.

BACKGROUND

Kanji researchers commonly begin their work by considering the many reasons why Japanese orthography is difficult. The author has observed these, and more, problems in kanji classes. Many of the problems stem from task difficulty. The writing system is made up of four scripts: kanji, hiragana, katakana, romaji and, in some instances, Arabic numerals (Kirwan, 2005). The kanji characters are physically complex and are phonemically very similar, making them difficult to commit to memory (Haththotuwa-Gamage, 2006; Mori, Sato, & Shimizu, 2007; Toyoda, 1998). Learners struggle with the time investment necessary for mastering the high number of kanji introduced and, as tertiary semesters are short, with the pace of introduction of new items. They may find it difficult to balance kanji learning with the acquisition of other skills required for fluency in the Japanese language (Smolensky, 1995; Yamashita & Maru, 2000).

A further set of problems arises for learners beginning kanji study without prior experience of orthographic scripts. The author has found that these non-kanji-background learners (NKBLs) often enter a tertiary kanji course with little understanding of the many steps and processes necessary for learning numerous multifaceted kanji characters in a short time. NKBLs find retention and recall of the combined physical, phonological and semantic aspects of kanji very challenging (Shen, 2004). They may not have sufficiently developed neural pathways to enable memorisation and recall of the high number of kanji in the curriculum (Chen & Tsoi, 1990) and their knowledge of the time it takes for practising kanji until automaticity takes place, will often be based on prior experience in other learning areas and may fall well short of what is actually needed to unconsciously recall kanji items.

NKBLs often begin successfully by processing simple pictorial kanji phonologically and visually as they have done when learning the English alphabet but when they encounter kanji with more complex physical and graphemic structures, they find the processing methods are insufficient (Rose, 2003; Toyoda, 1998). In the New Zealand tertiary situation, learning for NKBLs can also be hindered by affective issues arising from sharing classroom space with kanji-background learners (KBLs) who are freely able to write and recall kanji.

The author has observed that the KBLs with prior knowledge of kanji, from cultures where logographic scripts are used, often enter the kanji courses with the expectation that their knowledge of kanji characters will be sufficient to pass all the course outcomes, so they are often unwilling to learn unfamiliar script items such as *kun yomi*, the Japanese readings of the Chinese origin kanji, and foreign loanwords written in the syllabic script, katakana. Research on teaching and learning kanji has not taken into account the fact that natural attrition of kanji characters through long-term residence in European countries can also have an effect on kanji writing outcomes for learners with prior knowledge. Those learners are often impatient with classroom time spent on learning processes necessary for learners without prior knowledge. Impatience leads to a lack of attention when the small but significant differences in structure between some Chinese and Japanese kanji characters are introduced.

A further problem is that the methodology that informs the textbooks, classroom activity, and even learner strategy choice (Toyoda, 1995), is a traditional methodology designed for teaching kanji in Japan to L1 learners of Japanese. The traditional methodology is based on repeated writing of items, drill-based activities, and frequent testing. There is strong reliance on visual

reinforcement through plentiful reading material and kanji characters displayed many times in society (Carson, 1992, p. 49). These methods may be successful over long periods of time but are unsuitable for 12 to 15-week semesters in classes where there is a wide diversity of experience in learning logographic script and limited access to meaningful reading material at a beginner level.

The traditional methodology is also useful for learners adding new kanji items and kanji compound words to an existing schema where the initial process of automatization has already been developed at a young age through close attention to stroke order, the radical system, the origins of kanji characters and socially exercised repeated writing and reading activities in front of and with other class members (Bourke, 1996). Many beginners in tertiary kanji classes are not given the opportunity to experience these initial learning processes before being introduced to the traditional learning methods in kanji textbooks for adults.

Repeated writing is the main method of learning kanji in traditional methodology and learners from all backgrounds in all countries are still relying on this method (Shimizu & Green, 2002) because:

- they learned their first-language written script effectively that way;
- the method is endorsed in the kanji classroom; and
- the natural inclination to develop procedural memory for unconscious recall of script items is to write items repeatedly.

Repeated writing methods are essential for mastery of kanji but are only one of a range of learning steps and are unsuccessful unless the purpose of the writing is clearly understood by the learner and the repeated writing exercise is carefully structured with clear beginning and end points (Nesbitt, 2009; Yamashita & Maru, 2000).

Guidelines for learners in even the most recent of kanji textbook introductions follow traditional methodology. Stout and Hakone (2011) suggest repeated writing is one of the best ways to learn kanji and point out that there are many opportunities for writing the kanji on almost every page of their textbook, *Basic Japanese Kanji*. In the introduction to her textbook, *A Road to Kanji*, Toyoda (1990) also suggests that kanji are best learned by writing them repeatedly by hand.

A clear learning model is needed so that all learners can understand the place of learning practices such as repeated writing in the kanji-learning process. A model is also important to help them gain an understanding of how their personal pathway towards kanji mastery, in a culturally diverse classroom, differs from that of many of their peers. It is surprising that after more than 30 years of research into the teaching and learning of Japanese kanji the literature provides only one example of a model for learning kanji and, although computer-assisted kanji learning methods abound, there are no examples of a model-based CALL framework for learning kanji.

REVIEW OF THE LITERATURE

Successful learning models outside of the kanji learning field, such as Hoven's (1999) instruction design model for L2 listening and viewing comprehension, should have encouraged teachers of

Japanese to take a similar model-based approach to the complex problems of kanji learning. Hoven presents a clear theoretically-based framework and gives voice to the idea that a learning model alone is insufficient for solving learner problems; that “the use of computers needs to be located within a learning environment that promotes and supports the activation of learners’ mental processes across all activities and resources” (p. 98).

There have been few attempts to provide a model of kanji learning so that all learners are able to understand where their starting point is and are able to choose the most effective personal pathway to reach the challenging end requirements of a kanji course. Shimizu and Green (2002), in their article on the effect of teacher beliefs on learner attitudes, provided an overview of common and effective instructional strategies: rote, contextual, and mnemonic. These strategies provide a strong base for a model of kanji learning but the authors gave no indication of when in the learning process each of these strategies might be useful or how they could benefit the diverse learners in each kanji classroom.

Douglas (2004) describes in detail the frustrations learners feel when faced with the task of learning kanji. She describes instructional strategies for different stages of the kanji learning process such as using mnemonics and sound associations and from an early stage beginning to familiarise learners with component analysis – the breaking down of each character into smaller phonological or semantic elements that will be repeated in other kanji. At intermediate-level learning there is an increase in the number and complexity of kanji that learners are exposed to. At this time she suggests using various ‘listing’ techniques, favoured in traditional Japanese teaching of kanji characters but discredited in recent educational research (Erten & Tekin, 2008), such as grouping kanji words with similar grammatical functions, or listing frequent-use kanji and focusing on those in texts. She also presents instructional ideas for helping learners to lessen affective barriers such as equipping them with an understanding of why kanji are necessary. Douglas then suggests the beginner learner of kanji will use “preferred memory strategies to learn kanji effectively” (p. 6). The author’s experience as a teacher of kanji has shown that one of the main problems learners have is lack of instruction in the *learning* of kanji, the understanding and activation of memory strategies to aid in memorisation of large numbers of items in a short time frame.

Haththotuwa-Gamage (2004), through his richly heuristic work in the field of kanji-specific learner strategy use, has recognised the need for a framework of kanji learning based on three key assumptions:

- Individual learning styles need to be supported and developed within the kanji classroom.
- The outcomes of beginning learners will be improved if they are introduced to all possible strategies for learning kanji.
- Learners must be supported in learning how to assess the efficacy of their strategy choice.

He proposes a detailed framework based on kanji-specific learner strategy use within the wider context of Japanese language learning. A bottom-up approach has been adopted here, in which he is gathering results of strong empirical research that will form a framework of kanji learning in the future. The approach in this article, although based on the same assumptions, is a top-down conceptualisation of how a core model of kanji learning might look. The author’s proposed

model is seated within a flexible and easily refined framework of socio-cognitive instructional support. Future practitioner action research will provide data on patterns of learner engagement with the model and how well such a holistic framework meets the needs of diverse learner groups.

Bourke (1996) outlines the difficulties faced by beginning learners who have no prior experience with logographic scripts. One of her focus areas is identifying the stages of kanji learning with the aim of devising systematic learning methods for NKBLs. Bourke uses data from interviews with tertiary level kanji learners, principles of cognitive psychology including schema theory, and observation of traditional methods used to teach kanji to Japanese elementary school students in Japan. The methods Bourke observed in classes in Japan were: emphasis on stroke order; the radical system; use of visual imagery or stories to aid memorisation; and links with previously studied kanji. Bourke observed that these are not the repeat writing, testing, and reading-in-context methods seen in current kanji textbooks. Bourke suggests instructional methods used at elementary school are no longer relevant when kanji become automaticised in the later years of elementary school in Japan. Japanese writers of kanji textbooks may not remember the instruction they had in their early school years or may think the methods are too childish for adult learners of kanji.

Bourke's first model sets out the developmental stages of the kanji learning process in Japan. The stages – Initial learning period (1–250 kanji); Developing period (250–300 kanji); Pre-stable period (500–1000 kanji); and Stable period (1000+ kanji) – correspond roughly to the number of kanji learned over each two-year period of Japanese elementary school. For each stage Bourke gives the type of strategy use (conscious or automatic) and the amount of teacher support given. Bourke's (2006) research using her Strategy Inventory for learning Kanji (SILK) found that Grade 2 and 3 Japanese students were using similar strategies to those used by NKBL Australian university students.

Her second model, therefore, details specific instructional steps for each stage of kanji learning based on her observations in Japan. At Stage 1 (1–80 kanji) “Start with shookeimoji, strong teacher guidance emphasising correct stroke order, encouraging to pair opposites, compare kanji that are similar and look for similar parts recurring in kanji” (p.224).

Bourke's observations of L1 kanji learners have led to a breaking down of kanji study into a set of cognitive processes to be completed at specific stages of learning and, while it will not solve the problems experienced by learners other than NKBLs, we can begin to see how an instructional model will empower the learner with knowledge of the many processes it takes to learn kanji. The literature on kanji learning provides much detail on the difficulties faced by KBLs and NKBLs but minimal reference to the accommodation of different learner needs and levels through model and framework-based learning.

The literature on CALL for kanji mastery must also be reviewed, as computers are the necessary medium for the learning framework concept, based on three central tenets:

- CALL tools are efficient in an environment where time is short. There is no need for making flashcards, and databases can quickly provide individualised learning sets.

- CALL tools are numerous, varied and easily procured. Choices from the World Wide Web and from personal authoring can be provided for diverse learner groups with a range of learning needs. Socio-cultural learning practices can be increased when there are no longer the limitations of physical space as in textbook-based classroom situations.
- CALL Software authoring is no longer restricted to technical experts. Content can be created and shared by educators and can just as easily be removed or changed, thus avoiding costly mistakes.

CALL researchers are in agreement that material for learning kanji “needs to be individualized” (Komori & Zimmerman, 2001, p. 45) and that CALL is effective for both low and high proficiency learners (Komori & Zimmerman, 2001; Van Aacken, 1999). But these researchers are measuring the effectiveness of single tools for autonomous use by individuals, whereas the focus of this article is a package of numerous tools to meet the full needs of learners with the added advantage of providing them with an understanding of the learning process through a model and supporting framework.

The CALL tools reviewed by Komori & Zimmerman and Van Aacken are based on traditional precepts of learning kanji – reliance on individual informational and drill-based learning – whereas theory shows participatory learning and deep learning should be part of the learning process. The model in this article shows how a balance of these can be achieved.

THEORETICAL BACKGROUND TO CALL FRAMEWORK

Computer technology is the medium for the learning model and framework proposed in this article. A number of new technologies have been used to create specific software tools for each step in the learning process outlined in the model of kanji learning. In the opinion of the author, CALL is preferable for kanji learning because of the limitations of textbooks. Beginner textbooks are designed for learners with no prior knowledge of Japanese script items so are unable to meet the needs of the diverse learner groups in kanji classrooms. Physical space limitations in textbooks mean the practice tasks are too few to adequately enable full automatization of the high number of characters necessary even for basic Japanese reading skill. Socio-cultural changes leading a movement away from individual, competitive learning in recent educational practice are not well reflected in kanji textbooks, so learners are often not well prepared for moving on to practise collaborative or participatory learning after acquiring a base knowledge of kanji.

Reservations about Using CALL

Researchers and practitioners continue to express reservations about CALL even after a decade and a half of enthusiastic adoption of new CALL tools. Bax’s (2011) revisiting of normalisation, a concept he first proposed in 2003, has changed it from a vision of the future, where it rested for almost a decade, into a more realistic proposition but he hesitates to suggest it should be the default option for all learning materials. Bax (2011, p. 8) argues that those considering adopting a new technology should think closely about whether it “will in fact confer the expected benefits, or whether the same thing could be achieved by other means perhaps at less expense or in a shorter time frame ...”. Fortunately the continuing fast-paced development of CALL has

provided answers to these reservations. The development of mobile devices means learners are purchasing new hardware themselves, removing the need for educators to include in their development the initial cost of unproven hardware. Technology users are also demanding compatibility across platforms as they store more personal data. Educators are now easily able to upload content into a range of professional interfaces with many options for personalisation or change. Instructions can be understood by the layman and systems are in place to cut down development time.

McCarthy (2003) focuses on the profit-driven development of increasingly sophisticated technologies and suggests educators take a close look at the personal time investment they make when developing CALL tools, asking themselves whether a large enough group of learners will benefit from the learning tool and how long it is likely to last before being superseded by newer technologies. This is a valid point and a further reason for having frameworks of learning defining the use of CALL in all educational settings. A framework will provide links to many learning tools, both in-house curriculum specific tools and commercially produced tools that have been tested for efficacy. If software is superseded or found to be less effective than initially thought, newer software can seamlessly replace the original. With a framework in place it will be the processes in the learning model that will promote the learning. The tool will be only one of many available to the learner.

Although he has expressed reservations, Bax (2011) is clear that normalisation is both desirable and achievable. He outlines the requirements for normalisation. Theoretical principles must be established, followed by a needs audit involving all stakeholders. Close attention must be paid to effective educational practices and holistic support to avoid the temptation to see effective technology alone as answering all educational needs. The final requirement in the movement towards normalisation is situated and cyclical empirical research.

A Neo-Vygotskian Theoretical Approach

Bax firstly acknowledges the socio-technical and socio-cultural changes taking place in recent educational practice supported by a neo-Vygotskian theoretical approach, the key principles of which are: (1) learning and development are culturally based, social processes, developed communicatively; and (2) the limitations of individual learning can be overcome by timely scaffolding, or instructional support administered only until the learner is empowered to achieve the task successfully without further help (Benson, 1997). Bax considers these socio-cultural approaches will provide a clear pathway towards normalisation of technology, in contrast to the more common 'sole-agent' view that technology itself can promote positive learning outcomes (Bax, 2003).

The neo-Vygotskian principles provide a strong theoretical background for the framework of kanji-learning the author proposes. Kanji-learning practices are based on a traditional methodology developed for learning more than a thousand multi-faceted items. The practices are based on individual repeated writing and individual effort. Recent socio-cultural changes, as set out in neo-Vygotskian theory, have had minimal effect on these individual learning practices. There is value in a neo-Vygotskian approach where the learner and the teacher work collaboratively using a CALL medium that provides socio-cultural opportunities for learning.

In kanji learning, in particular, tensions do exist between Vygotsky's (1987) assertion that scientific concepts should be presented to learners as precise verbal definitions, and Karpov's (2003) view that those concepts are without value unless followed through by procedural development. Research by Corder (2002) showed that this is indeed the case when using CALL tools for kanji learning. Corder noted that learners who predominately used the HyperCard lesson stack (detailed information/concepts) in her QT Kanji project, were more likely to fail the examination than those who predominately used the writing stack (procedural practice of concepts) either by itself or in combination with other stacks.

A model of kanji learning will clarify how both declarative and procedural steps are accommodated in the learning process. Learners will be able to see a map of learning processes, not a single method of learning.

Bax (2011, p. 9) recommends that the central focus of a "Needs Audit" should be on learning rather than on learners, as a learner-centred approach has in the past been poorly interpreted to mean that learners' preferences should lead learning practices and that if learners like playing computer games then this should be the learning medium provided. The author fears that focus on learning linked to neo-Vygotskian sociocultural principles can similarly be open to misinterpretation and can lead to a type of sole agency in which, for example, we decry all individual work in favour of collaborative work. The learning model and instructional framework presented in the next section complement Bax's work by clearly showing where in the learning process the respective learning practices can work well.

THE MODEL OF KANJI LEARNING

The proposed model of kanji learning (Table 1) and framework (Table 3) are based on three key concepts in Hoven's (1999) model-based learning:

- The model presents a clear outline for students.
- It is theoretically based.
- The model alone will not be effective without a supporting framework.

The structure of the model and the terms for each learning step are devised by the author. The 'Knowledge Base' draws on Bourke's (1996) models of the juvenile steps required for kanji learning.

Table 1.
The Model of Kanji Learning

The Model of Kanji Learning		
KNOWLEDGE BASE	KNOWLEDGE TRANSFORMATION	KNOWLEDGE TESTING
Informational Learning Structural Learning	Contextual Learning (writing) Contextual Learning (reading)	Kanji Writing Kanji Reading
Lifelong Memory Development (timed) Lifelong Memory Development (self-led)	Lifelong Memory Development (personal) Lifelong Memory Development (extended)	
Simple Contextual Learning (reading) Simple Knowledge Sharing (writing)	Knowledge Sharing	

The proposed model is a balanced division between kanji acquisition and the contextual application of learned kanji. It sets out the full learning process from beginner to advanced level. The model is situated on the kanji learning website with a chart linking each learning step to one or more learning tools. A key feature of the CALL tools devised or chosen by the author is their simplified authoring input, so that the full learning package can be adapted and used with different curriculum content across the secondary and tertiary sectors in hybrid (combination of formal classroom instruction and supervised or unsupervised self-access) learning situations.

Current research on kanji learning has provided a good picture of instructional content and learning strategies. At no stage, however, have these and other facets of kanji learning that contribute to the mastery process been brought together and matched with learning tools and learning support in a full framework.

There is a clear separation between learning processes for building knowledge ('Informational Learning', 'Structural Learning') and those that set knowledge in the procedural memory for unconscious recall to take place ('Life-long Memory Development' processes) or test knowledge recall ('Contextual Learning' and 'Knowledge Sharing'). The model is not a linear one. With guidance learners will be able to choose an individual pathway that takes into account their prior knowledge and current needs. The CALL version of the model includes hyperlinks showing the skills that constitute each learning step (Table 2). Learners are then directed to a chart that outlines dedicated learning tools on the website for the practice of each skill.

Table 2.
Hyperlink Explanations of Specific Steps

Knowledge Base (Building the Knowledge)					
Informational Steps	Learning	Structural Steps	Learning	Memory Development Steps	
<i>stroke order</i>		<i>components of kanji</i>		Timed <i>kanji memorized</i> <i>mistakes practised</i>	Self-Led <i>kanji memorized</i> <i>all kanji reviewed</i>
<i>on/kun readings</i>		<i>history of kanji</i>			
<i>meaning in own language category (noun/adj. etc.)</i>		<i>radicals</i>		<i>kanji reviewed</i>	<i>random checking</i>
<i>character shape and balance</i>		<i>mnemonics (memory aids)</i>		<i>mistakes practised</i>	
		<i>kanji words in sentences</i>			
Simple Contextual Learning (Reading)		Simple Knowledge Sharing (Writing)			
<i>writing hiragana equivalents for kanji words</i> <i>writing hiragana equivalents for kanji words in simple sentences</i>		<i>peer practise information gap</i> <i>socket programming quizzes (peer comparison of answers in real time)</i>			

Knowledge Transformation (Using the Knowledge)		
Contextual Learning (Writing)	Contextual Learning (Reading)	Knowledge Sharing
<i>answering questions using learned kanji</i> <i>creating own sentences using learned kanji</i> <i>digital story-telling</i>	<i>hobby reading using digital kanji reader</i> <i>creating own kanji bank from reading</i> <i>mastery reading</i>	<i>Group Activities:</i> <i>creating tests for peers</i> <i>creating stories with kanji sets</i> <i>computer games</i> <i>shared reflection on learning</i> <i>online projects</i>

Repeated Writing

A core type of learning, ‘Lifelong Memory Development’ extends right across the model and is of primary importance for memorisation and recall of the many required kanji. Two aspects of rote learning – (1) the necessity of repeated writing; and (2) task boredom – have been considered in the construction of the ‘Lifelong Memory Development’ section of the model and the accompanying list of learning tools:

1. Questions have been asked about how necessary the difficult skill of writing kanji is, when Japanese written communication is now predominately done on computers and the ‘writing’ of kanji consists of choosing from a list of phonologically matching characters (Allen, 2008). The debate, embedded in larger cultural and historical issues, is not easily resolved so the author justifies a continued emphasis on rote learning of the writing system on evidence that writing kanji words draws attention to the complex structure of the words and aids the establishment of stable orthographic representations of those words in the memory (Thomas & Dieter, 1987). All of the author’s Memory Development

writing tools have manual writing as a core action and all automatisisation tools (computer games) have writing elements. Until touch screen writing technology becomes available to all learners the author is using virtual/manual tools where the stimulus (e.g. a flashcard set) is a CALL tool and the learner responds by writing in an appropriately sectioned and dated notebook.

2. Rote memorisation is not an engaging practice due to the complexity of the items being learned, the repetitive nature of the learning and the number of repetitions needed for full automatisisation and clear recall. Learners who lack motivation, are imprecise or distracted, or have issues with affect, are unlikely to persevere with this type of learning therefore two flashcard-tool types are offered. The self-led flashcard tool is controlled by the learner who decides how many repetitions are needed whereas the timed tool is an incremental rehearsal flashcard tool which has “an adaptive sequencing procedure, or an algorithm to change sequencing of items based on learners’ previous performance on individual items” (Nakata, 2011, p. 23). Such a tool aids the unmotivated learner by removing the need to decide what needs to be revised and by providing numerous computer-generated repetitions of previously mistaken kanji to increase the chances of automaticity developing.

As kanji present with different readings depending on the word they appear in, kanji learning is more akin to vocabulary learning than mastery of an alphabet (Douglas, 2004), therefore rote learning practices do not stop with the acquisition of a strong Knowledge Base. When learners have reached the ‘Knowledge Transformation’ stage, rote learning remains an important part of their study but they will have less time to complete this type of practice because of increased and more challenging contextual study requirements and, after making a significant effort in the ‘Memory Development’ process of the ‘Knowledge Base’, they are often not motivated to put the same cognitive effort into advanced rote learning. With a personalised flashcard tool, individual learners can choose from a database only the kanji that they still find difficult to memorise, or the very recently encountered kanji, and these will become a less numerous set of cards personalised with an individual login.

‘Extended Memory Development’ is simply the addition of other card sets to the original set. This may include vocabulary cards and simple sentence translation cards. When a learner has a base kanji knowledge and can move towards ‘Knowledge Transformation’ there will be a greater need for Japanese grammar and vocabulary knowledge to keep pace with kanji knowledge as the study will now be, in essence, kanji in the Japanese language context.

A second rote memorisation innovation, to alleviate task boredom, is the introduction of computer games designed to develop automaticity of kanji words through increasingly fast and challenging simulated real-life experience such as seeing and remembering detail from advertising posters on a city bus ride. The computer games use a multi-choice function with oral reinforcement of correct answers and have a secondary virtual/manual writing element.

Socio-Cultural Learning

The importance of rote memorisation and the emphasis on individual effort in traditional methodology has led many teachers and learners to perceive kanji learning as solely a memory development process. This model recognizes both the need for a high percentage of rote memorisation for kanji mastery and the advantages, expressed most clearly in neo-Vygotskian theory, of collaborative, participatory learning. In a CALL supported hybrid classroom or in guided self-access, rote memorisation (Lifelong Memory Development) and collaborative learning (Knowledge Sharing) would be integrated learning processes. Learners might, for instance, use computer games designed to improve automatisisation of kanji words (rote memorisation) with shared scoring and reflective wiki (collaborative learning). The distinct separation in the learning model presented in this article is to emphasise that a number of different processes are necessary for learning kanji and rote memorisation alone is an ineffective pathway to mastery.

Three obstacles hinder smooth adoption of socio-cultural practices in kanji learning: the teaching and learning is embedded in traditional methodology based on individual effort; the requirement for a high percentage of rote learning to achieve automatisisation of kanji cannot be ignored; and a percentage of the kanji classroom learners are KBLs who have prior experience in passive, individually directed learning situations where all learning stems from the teacher and peer enhanced learning is considered of low value.

Participatory learning is an integrated part of the kanji-learning package presented in this article but it is carefully scaffolded to allow all learner groups to become used to learning practices they may be unfamiliar with. Firstly incidental pair games are included in the learning programme. These are conducted online but are no different from classroom activities such as information gap exercises and short competitions where speed as well as correctness are required for success.

A higher level of pair work is then introduced through ‘socket programming’ whereby learners type in answers to questions on their own computers and are then able to compare answers with those of a peer in real time and are able to reflect on any differences in the answers. This is a potentially embarrassing activity but appears to be acceptable to learners as paired computers are at some distance from each other, making it seem like there is no face-to-face interaction involved. Further research needs to be completed on learner experience of this innovation.

Finally the ‘Complex Knowledge Sharing’ section of the model encourages deeper learning through peer testing, group activities and group projects. As the kanji learning package is designed for hybrid learning with a high self-access content, the support framework is also invaluable for further developing participatory learning through its ‘Guidance’ and ‘Engagement’ sections (Table 3), with activities such as peer advice, peer chat, discussion forums, project wikis and the sharing of resources.

THE LEARNING FRAMEWORK

The author has found that CALL tools, however well designed or pedagogically sound, will not guarantee improved learner outcomes without a holistic support framework, and even the clearest

online instructions may not be understood by the learners in the way intended (Nesbitt, 2012), so much attention in this project has been paid to the creation of a framework to support the kanji model and accompanying suite of learning tools. Learners may not engage with online material for a number of reasons: they may lack familiarity or skill with computers; they may have poor employment or understanding of learning strategies; they may be overwhelmed by the choices available and use only the one learning tool they like as a default option; or they may not understand the instructions for use. A two way holistic approach is envisaged for this project in which both the facilitator and the online framework provide technical help, learning strategy training, facilitation of learner engagement through feedback and learning plans, and review of past learning. The two-way support is not intended to be merely a repetition of the same advice. The teacher could invite proficient IT users in the classroom to become ‘computer buddies’ for less proficient users as well as providing online help cards for problems such as login issues, typing using Japanese script, etc. Good learning strategies can be modeled in the classroom and then given more detail as a blog online for further viewing and discussion. Group work in the classroom can also be enhanced by online peer advice, peer resource sharing and shared discussion of learning issues in a wiki.

Table 3.
Elements of the Online Learning Framework

Guidance	<i>help cards/guides to using learning tools planning advice/learning advice (experts) learning advice (peers and teachers) contact with teacher</i>
Feedback	<i>personal record of achievement for all learning tools personal reflection on results reflection and planning for future success with teacher feedback</i>
Review	<i>peer testing with reward system review of items studied reflective self testing examination practice scripts</i>
Engagement	<i>teacher blog on learning strategy use public links to kanji learning blogs peer chat facility discussion forum photo gallery</i>
Presentation	<i>group project wikis learning plan templates and examples digital storytelling instructions and examples</i>

The overall aim is a complete package for learning. The learning model clarifies the steps in kanji learning and learners are advised on how to use it to develop a personal learning plan. Learning tools they can use are linked to each step. The surrounding framework is focused on sharing the learning experience among experts, teachers and learners to improve the quality of learning.

The model of kanji-learning and instructional framework should be seen primarily as a clarification tool, bringing together essentials for kanji learning. The model and framework

directly address the problems arising from the four areas of kanji complexity: task difficulty; problems for KBLs; problems for NKBLs; and an outmoded traditional instructional methodology.

The task is undeniably difficult. The framework brings together all available learning tools for ease of access. The neo-Vygotskian approach is based on the precept that the right kind of instruction can overcome individual learning limitations. Bourke (1996) considers learners themselves must play a role in deciding what the right kind of instruction is: “Students need to be exposed to all the strategies they could possibly use and the way to use them to enable them to decide on the combinations which best suit their learning style” (p. 56). Other studies also advise providing beginning learners with as full a range of learning strategies and learning tools as possible (Haththotuwa-Gamage, 2004; Lian & Lian, 1997). Without a framework to centralise the complete range of resources and strategies for learners and link them to the learning process, learners may not attempt to critically assess the learning methods and strategies they commonly employ.

DISCUSSION

A model-based learning package of this nature is not without limitations. It is too large and costly for a single educator to produce and manage effectively. It is ideal as a widely shared resource but the demand for personal login-based material means it could not be hosted by a university’s blackboard system. Public hosted websites have ongoing costs and require reasonable IT skill levels. The high difficulty levels of kanji learning and the lack of a modern pedagogy and easily available resources, however, suggests that it is imperative such a resource is constructed, evaluated across a number of learning situations and made available to the secondary and tertiary sectors.

If such a package were to be used widely, the many innovations – computer gaming for automatisation of kanji; integrated socio-cultural learning; a model-based approach to kanji learning; and the provision of a full support framework with instructional tools – would serve to enliven CALL research on the teaching and learning of foreign language orthographies. Empirical research has not been completed on these concepts to date in the field of kanji learning.

Framework-based learning of the type presented in this article lends itself well to CALL Hybrid learning situations which feature prominently in recent foreign language learning pedagogy. This kanji-learning package is designed to be used in addition to the normal complement of face-to-face teaching hours. However, guidance and support in using the CALL online framework is integrated into the classroom curriculum so that online activities, such as the initial use of each of the tools provided online and the development of learning plans, take place in the classroom with teacher guidance and, conversely, curriculum content presented in the classroom is available online for review and self-paced learning.

CONCLUSION

It is well documented that task difficulty can cause negative de-activating emotions that have been linked to lowered intrinsic motivation and desire to escape the task (Oxford, Cho, Leung, & Kim, 2004; Pekrun, Goetz, Titz, & Perry, 2002). The learner of kanji, with or without prior experience of logographic scripts, will inevitably face some of these many difficulties. The difficulties will often be exacerbated by extrinsically imposed limiting factors such as short learning time, fast pace of introduction, equally challenging content in the Japanese language – of which kanji is only a small but essential part – and the necessity of keeping Japanese grammar, vocabulary and kanji knowledge in balance to be able to write and read kanji in context. These limiting factors are not easily changed but methodology is a variable that can be influenced by the instructor. The methodology currently embraced by the majority of instructors and learners is based on adult learning in a target culture where unconscious recall of kanji has already been achieved in early school years. The methods are presented in textbooks that are unable to fully cater for learner diversity in the tertiary kanji classroom, nor provide adequate practice for the development of full automaticity.

This article presents a conceptual CALL model of kanji learning with a supporting framework of instruction, guidance, feedback and review. The CALL model is based on the two main neo-Vygotskian theoretical principles of learning: learning is a socio-cultural activity; and, scaffolding in learning is essential. Computer technology holds many advantages over the textbook medium. There are many opportunities for social and collaborative learning and many choices for learning tools. The full range of resources, the model to base learning choices on, the strategy training, the provision for individual learning style, individual proficiency and prior learning are all essential elements of scaffolding that form the basis of this kanji-learning package.

With the use of learning frameworks the author expects to see a significant shift in focus from consideration of how effective single methods can improve particular areas of kanji-learning to how numerous pedagogically-sound methods can be framed and presented so that learners in diverse and highly complex learning situations such as kanji are able to improve their own learning. The model of kanji learning proposed in this article will clarify the learning process and help learners understand and overcome the many difficulties they encounter.

ACKNOWLEDGEMENTS

The author gratefully acknowledges the helpful comments and suggestions of colleague, John Bitchener, and of the anonymous reviewers on the earlier versions of this article.

REFERENCES

- Allen, J. R. (2008). Why learning to write Chinese is a waste of time: A modest proposal. *Foreign Language Annals*, 41(2), 237–251.
- Bax, S. (2003). CALL-past, present and future. *System*, 31, 13–28.

- Bax, S. (2011). Normalisation revisited: The effective use of technology in language education. *International Journal of Computer Assisted Language Learning and Teaching*, 1(2), 1–15.
- Benson, B. K. (1997). Scaffolding (Coming to terms). *English Journal*, 86(7), 126–127.
- Bourke, B. (1996). *Maximising efficiency in the kanji learning task*. Unpublished doctoral thesis, University of Queensland, Australia.
- Bourke, B. (2006). Strategy inventory for learning kanji (SILK). Retrieved Sept 11, 2012, from [http://kanji-silk.net/profile/documents/SILK test questions.pdf](http://kanji-silk.net/profile/documents/SILK_test_questions.pdf)
- Carson, J. G. (1992). Becoming biliterate: First language influences. *Journal of Second Language Writing*, 1(1), 37–60.
- Chen, H., & Tsoi, K. (1990). Symbol-word interference in Chinese and English. *Acta Psychologica*, 75, 123–138.
- Corder, D. (2002). *The QT Kanji project: An analysis of the relationship between computer assisted language learning (CALL) and the development of autonomous language learners*. Unpublished master's dissertation, Massey University, Palmerston North, New Zealand.
- Douglas, M. (2004). Learning and teaching kanji: For students from an alphabetic background. Retrieved March 6, 2006, from <http://www.sabotenweb.com/bookmarks/about/douglas.html>.
- Erten, H., & Tekin, M. (2008). Effects on vocabulary acquisition of presenting new words in semantic sets versus semantically unrelated sets. *System*, 36(3), 407–422.
- Haththotuwa-Gamage, G. (2004). *Understanding the kanji learning process: Strategies, identification and behavior of learners of Japanese as a foreign language*. Unpublished doctoral dissertation, University of Queensland, Australia.
- Haththotuwa-Gamage, G. (2006). Perceptions of kanji learning by non-native learners of Japanese as a foreign language: Data from Sri Lankan learners. *Japanese Linguistics*, 20(2), 1–11.
- Hoven, D. (1999). A model for listening and viewing comprehension in multimedia environments. *Language Learning and Teaching*, 3(1), 88–103.
- Karpov, Y. V. (2003). Vygotsky's doctrine of scientific concepts. In A. Kozulin, B. Gindis, V. Ageyev & S. Miller (Eds.), *Vygotsky's Educational Theory in Cultural Context* (pp. 65–82). Cambridge, U.K.: Cambridge University Press.
- Kirwan, L. (2005). Harnessing furigana to improve Japanese learners' ability to read kanji. *Babel*, 40(1), 18–25, 38.
- Komori, S., & Zimmerman, E. (2001). A critique of web-based kanji learning programs for autonomous learners: Suggestions for improvement of WWWKanji. *Computer Assisted Language Learning*, 14(1), 43–67.
- Lian, A., & Lian, A. (1997). The secret of the Shao-Lin Monk: Contribution to an intellectual framework for language learning. Retrieved May 15, 2012, from <http://andrewlian.com/andrewlian/prowww/shaoin/psupres2.htm>
- McCarthy, B. (2003). Investment and returns in CALL development. *CALL-EJ Online*, 4(2).
- Mori, Y., Sato, K., & Shimizu, H. (2007). Japanese language students' perceptions on kanji learning and their relationship to novel kanji word learning ability. *Language Learning*, 57(1), 57–85.
- Nakata, T. (2011). Computer-assisted second language vocabulary learning in a paired-associate paradigm: A critical investigation of flashcard software. *Computer Assisted Language Learning*, 24(1), 17–38.

- Nesbitt, D. (2009). Achieving unconscious recall of kanji: Can rote learning help? *New Zealand Studies in Applied Linguistics (NZSAL)*, 15(2), 61–73.
- Nesbitt, D. (2012). Student evaluation of CALL tools during the design process. *Computer Assisted Language Learning*, in press. Retrieved January 15, 2012, from <http://www.tandfonline.com.ezproxy.aut.ac.nz/loi/ncal20>
- Oxford, R., Cho, Y., Leung, S., & Kim, H. (2004). Effect of the presence and difficulty of task on strategy use: An exploratory study. *International Review of Applied Linguistics in Language Teaching*, 42, 1–47.
- Pekrun, R., Goetz, T., Titz, W., & Perry, B. (2002). Academic emotions in students' self-regulated learning and achievement: A program of qualitative and quantitative research. *Educational Psychologist*, 37(2), 91–105.
- Rose, H. (2003). Teaching learning strategies for learner success. *Babel*, 38(2), 32–36.
- Shen, 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), 167–181.
- Shimizu, H., & Green, K. (2002). Japanese language educators' strategies for and attitudes toward teaching kanji. *The Modern Language Journal*, 86(2), 227–241.
- Smolensky, V. (1995). The chain method of studying Japanese characters. Retrieved April 30, 2012, from <http://www.susi.ru/kanji/ChMethod.html>
- Stout, T., & Hakone, K. (2011). *Basic Japanese Kanji*. Singapore: Tuttle Publishing.
- Thomas, M., & Dieter, J. (1987). The positive effects of writing practice on integration of foreign words in memory. *Journal of Educational Psychology*, 79(3), 249–253.
- Toyoda, E. (1990). *A Road to Kanji*. Tokyo, Japan: Bonjinsha.
- Toyoda, E. (1995). Learners' feelings toward kanji study. *Journal of Japanese Language Teaching*, 85, 101–113, 206.
- Toyoda, E. (1998). Teaching kanji by focusing on learners' development of graphemic awareness. *Australian Review of Applied Linguistics*, 21(15), 155–168.
- Van Aacken, S. (1999). What motivates L2 learners in acquisition of kanji using CALL: A case study. *Computer Assisted Language Learning*, 12(2), 113–136.
- Vygotsky, L. S. (1987) *The Collected Works of L S Vygotsky: Vol 1 Problems of General Psychology*. New York: Plenum. (Original work published in 1934.)
- Yamashita, H., & Maru, Y. (2000). Compositional features of kanji for effective instruction. *The Journal of the Association of Teachers of Japanese*, 34(2), 159–178.