A Thesis

entitled

Improving Orthographical Errors in Kanji: Integrating Calligraphy Methods into the JFL Classroom

by

Kasumi Yamazaki

Submitted to the Graduate Faculty as partial fulfillment of the requirements for the Master of Arts Degree in English

Dr. Douglas W. Coleman, Committee Chair

Dr. Joseph Hara, Committee Member

Dr. Joel Lipman, Committee Member

Dr. Patricia Komuniecki, Dean
College of Graduate Studies

The University of Toledo

May 2011
An Abstract of

Improving Orthographical Errors in Kanji: Integrating Calligraphy Methods into the JFL Classroom

by

Kasumi Yamazaki

Submitted to the Graduate Faculty in partial fulfillment of the requirements for the Master of Arts Degree in English

The University of Toledo
May 2011

This thesis investigates issues in the orthographical errors Japanese as a Foreign Language (JFL) learners face when learning to write kanji. In particular, the study analyzes the learners’ kanji error production in terms of proportion and spacing, examining to see whether these errors would be improved after receiving special calligraphic instruction. Fourteen advanced-level JFL learners participated in two sessions: traditional and kōhitsu instruction (pen/pencil calligraphy), and were then assigned to practice kanji for a week with a separate specialized kanji sheet. After completing each task, newly learnt kanji compound words were assessed in the kanji tests.

Four items retrieved from the tests were pair-matched based on the kanji orthography and structure for text analysis. The items were evaluated based on the examined criterion, then the scores of each item were coded into statistical analysis in order to examine the occurrence of the error improvement. Some improvements were observed in proportion and spacing. However, a numbers of factors may mediate the effectiveness of using specialized kanji practice sheets.
For my colleagues I worked with in the M.A. ESL program and Japanese department, who inspired me to view the world from different angle. For my best friends, Nayem and Michelle, who have always been there for me. Most importantly, for my father, Yuichi, and mother, Misako, who have committed their whole life to have me continue education here in the United States since the day they saw me off in tears at the airport. All of your love and support have helped me to gain strength to go through some difficult times in these past six years. My dream would have never been accomplished without any of your encouragement and care. Thank you very much.
Acknowledgement

I express my deepest gratitude to my thesis adviser, Dr. Douglas Colemen, who has supported me from the initial to the final stages of my thesis, and has helped me to develop an open minded understanding of the subject. In addition, I am greatly thankful to Dr. Joseph Hara and Dr. Joel Lipman who have given me their precious contributions to the completion of my thesis.

Also, I would like to thank Mr. Joshua Paiz who has assisted me in various aspects of this thesis, and also has been a great colleague and friend to work with in the M.A. ESL program.

I deeply thank all of you who have made this thesis possible. I am honored to have an opportunity to meet and receive such wonderful guidance and encouragement in order to achieve what I have dreamt since I was a child.
# Table of Contents

Abstract iii  
Acknowledgments v  
Table of Contents vi  
List of Tables ix  
List of Figures x  

## I. An Overview of JFL Kanji Learning  
   A. Introduction 1  
   
   B. Kanji Acquisition Strategies in the JFL Classroom 2  
   a. Storing Kanji in Long-Term Memory 3  
   b. Strategies for Processing Kanji 4  
   c. Common Kanji Strategies in the JFL Classroom 6  
   
   C. Issues in Kanji Acquisition in the JFL Classroom 8  
   a. Structural Difference in Reading and Writing Kanji 8  
   b. Motivational Difficulties in Learning Kanji 9  
   c. JFL Learners’ Kanji Error Analysis 10  
   
   D. New Approach: Integrating Calligraphy Methods into the JFL Classroom 14  
   a. Calligraphy as a Strategy of Learning Kanji 14  
   b. Calligraphy Instruction for Language Learning in Japan 15  
   c. Kōhitsu Rote Learning Method for Kanji Error Improvement 16  
   d. The Present Study 18  

## II. Methodology 19  
   A. Introduction 19
B. Participants
   a. Participants Selection 20
   b. Participants Backgrounds 21

C. Test Procedures 22
   a. Traditional Input (Chapter 8) 23
   b. Kōhitsu Input (Chapter 9) 24
   c. Kanji Test 25

D. Data Coding 26
   a. “Kanji Errors” in this Study 26
   b. Proportional Errors 27
   c. Spatial Errors 28
   d. Coding Items from the Kanji Tests 29

III. Results, Discussion & Limitations 31
   A. Introduction 31
   B. Results 31
      a. Kanji Compound Words Item 1 32
      b. Kanji Compound Words Item 2 33
      c. Kanji Compound Words Item 3 34
      d. Kanji Compound Words Item 4 34
   C. Discussion 35
b. Research Question 2: Do JFL Learners Improve Their Penmanship in Terms of the Character Proportion or Spacing or the Component Proportion or Spacing? 36

c. Research Question 3: What is an Effect when JFL Learners Use Specialized Kanji Sheet for Practicing Kanji? 38

d. Possible Implications for Teaching Kanji 39

D. Limitations and Future Research 40
   a. Framework of the Research 40
   b. Disagreement between Two Scorers 41
   c. Future Research 42

Appendices
Appendix A: Kanji Chapter 8 Kanji Practice Sheet 45
Appendix B: Kanji Chapter 9 Kanji Practice Sheet 46
Appendix C: Kanji Test A (Chapter 8) 47
Appendix D: Kanji Test B (Chapter 9) 48
References 49
List of Tables

Table 1. Summary of the Results of Error Improvement........................................ 37
List of Figures

Figure 1. Pair-Kanji Item Selection................................................................. 26
Figure 2. Criteria of the Kanji Errors............................................................ 27
Figure 3. Samples of Inter-Character (y) and Inter-Component (x) Spacing......... 29
Figure 4. Component Type........................................................................... 43
Chapter One
An Overview of JFL Kanji Learning

Introduction

In the past two decades, there have been an increasing numbers of studies published in the field of language learning strategies (Mori, 2003, p. 404), among which Japanese as a foreign language (kanji in particular) has gained recent attention.

When native speakers of Japanese communicate with written texts, they use five distinct scripts. The three major scripts used in texts are Hiragana, Katakana, and kanji; as well as the case-textural usages of Roman characters and Arabic numerals. To give a very brief description of each script, Hiragana and Katakana characters both use syllables to represent sounds, while kanji uses logographic characters representing the meaning of the word. These five distinct scripts are all combined and used effectively in day to day writing. Unlike alphabetic orthography, in Japanese “the knowledge of about 1,000 basic kanji characters are imperative to comprehend written Japanese such as that used in newspapers” (Van Aacken, 1999, p. 117), and it requires the knowledge of approximately 40,000 recognized kanji for one to achieve mastery of written Japanese.

While there is interest by many to learn kanji, the precision in which needs to be written with seems to be of a great challenge for foreign learners of Japanese (Cook, Hijihara, & Tahara, 1997). Nevertheless, there is simply not enough time allowed for kanji instruction in the JFL classroom. Therefore, learners are often required to devise their own strategies for learning kanji (Noguchi, 1995). Under the limited time constraints of the standard class period, it is important we identify the effective kanji learning strategies and apply these in the classroom in order to help
facilitate Japanese as a Foreign Language (JFL) learner’s recognition, production, and retention of kanji characters. This chapter will first review current research being done on kanji acquisition, analyzing the issues in terms of difficulties in the linguistic structure of kanji and learners’ motivation. The chapter will then examine the analysis of JFL learners’ common kanji errors. Taking these issues into consideration, this chapter will support Asaoka’s new approach of integrating calligraphy as a strategy of learning kanji (Asaoka, 2009; Asaoka, 2010) by discussing the potential to improve learners’ kanji production through traditional calligraphic methodology.

**Kanji Acquisition Strategies in the JFL Classroom**

Kanji is a very complex system involving sets of less complex parts known as radicals and components; characters that provide information for the character about meaning and pronunciation (Mori, 2003). According to Mori, Sato, and Shimizu (2007), “kanji knowledge is a multifaceted notion” (p. 59). Many researchers recognize that the learning of kanji requires one to obtain different linguistic understandings of kanji, and not only in terms of production or recognition, but also associated speech (on- and kun-reading¹), meaning, and occurrence alone or in combination (see Habein, 2000; Matsuda, 1998; Morita and Tamaoka, 2002a; Morita and Tamaoka, 2002b; Morton, Sasanuma, Patterson, & Sakuma, 1992; Shimomura, 1999; Van Aacken, 1999). Understanding the linguistic complexity of learning kanji, various strategies and methodologies for kanji acquisition have been examined.

Haththotuwa Gamage (2003a) overviews the current trends in kanji learning strategy research, highlighting that the studies tend to focus on three main categories: 1)

---

¹ On-reading is based on original Chinese reading of kanji characters while kun-reading is native Japanese reading.
the specific relationship between kanji strategies in regards to language learning strategies in general, 2) how learners’ background and native language affect the learning of kanji, and finally, 3) analysis on the characteristics of common strategies for teaching and learning kanji (Haththotuwa Gamage, 2003a). In order to understand the process of kanji acquisition and such complex structure, it is necessary to know the various strategies of teaching and learning kanji established in the JFL classroom.

**Storing Kanji in Long-Term Memory.** Koyama, Hansen and Stein (2008) investigated the relationship between different skills of kana/kanji literacy acquisition. Based on a non-verbal IQ Test, literacy, multiple cognitive and sensory tasks, the research emphasized the importance of visual long-term memory in kanji acquisition. Based on the data analysis, Kana were represented by the low-level sensory possessing tasks while kanji were strongly represented from long-term visual memory (Koyama, Hansen, and Stein, 2008). These findings seem to suggest that the strategies which help learners to store kanji in long term memory need to be emphasized. Authors further indicated that the “visual-motor interaction may facilitate memory consolidation for the visual features of kanji characters and make a specific contributions to learning to write kanji” (p. 51). Thus, writing out kanji repeatedly by tracing stroke orders can help to store characters in long term memory.

As a matter of fact, the textbooks widely used in JFL classroom often use “a thematic frequency-based approach” which allows JFL learners to be exposed to target kanji many times to help associate with their long term memory (Asaoka, 2010). While thematic frequency-based approach seems to be practical for storing kanji with semantics, numerous kanji tend to be limited since they are still within the theme of the context. In
addition, the learners might not be able to store kanji simply from recognition. Since writing out kanji involves visual-motor associations, by doing so multiple times will associate it with its visual, auditory-articulator, and meaning. Therefore, the actual writing of the character itself needs to be taken into account for successful retention of kanji.

**Strategies for Processing Kanji.** There seem to be two major distinct approaches on whether recognition or production needs to be emphasized when kanji is first introduced (Matsunaga, 1995). Some researchers emphasize the importance of kanji recognition skills in order to gain familiarity with processing kanji before producing them. For instance, Allen (2008) argues that learning to write kanji from memory is inefficient due to the time-consuming workload. Instead, he suggests using electronic word-processing as a strategy to acquire kanji by negotiating “the tension between expectation and practicalities of writing” (Allen, 2008, p. 244). Although this method may facilitate JFL learners’ ability to recognize kanji, the question remains whether or not this approach will help them to store kanji into long-term memory. As for kanji production, writing practice may associate a beneficial visual-motor connection in long-term memory.

Even outside of the classroom, advanced JFL learners are encouraged to read authentic materials to further their literacy development, which will most likely include unknown kanji vocabulary words in the texts. The JFL learners are required to recognize the meaning of unknown vocabularies, including kanji, which is quite challenging for them. Kondo-Brown (2006) investigated the advanced JFL students’ ability to infer the meaning of unknown kanji from context, indicating that although students attempted to guess the meaning of unknown kanji (using context), the success rate was 16.7%. This
result was calculated based on the numbers of cases when target words were correctly identified by the participants. Those who succeeded in inferring were students familiar with kanji semantics and phonologies of the unknown kanji characters. Thus, the author suggested that “kanji instruction that explicitly teaches both phonological and visual features of target kanji characters should continue in advanced JFL classroom” (Kondo-Brown, 2006).

Since each kanji character can contain a number of different meanings, understanding of the kanji semantics as a whole is also of great challenge for JFL learners. Mori (2003) investigated the JFL learners’ ability to derive the meaning of unknown compound words that consist of familiar kanji based on a kanji test and qualitative methods. In this study, participants were first given a pretest to determine familiarity of the individual kanji characters and then took part in a second test. Based on the pretest’s results, the researcher carefully selected kanji compound words for the second test that consisted of: isolated compound kanji words, compound kanji words in-context, and both retrieved from the pretest. The results of this study showed that neither word morphology nor context were effective methods to predict the unknown kanji compound words. In terms of semantic relatedness, there was no difference between the ability to make an inference in isolation vs. in context, while the combined method appeared to be more successful than isolated inference. In addition, the learners’ predictions of kanji words in context were made syntactically while predictions of words themselves were made semantically (Mori, 2003). Based on the findings from the examples of different strategies for kanji recognition, it seems that it is ideal for JFL learners to be encouraged
to use multiple strategies for successful understanding of kanji semantics in order to process kanji words successfully.

**Common Kanji Strategies in the JFL Classroom.** Shimizu and Green (2002) overviewed teachers’ attitude towards kanji, analyzing the common kanji learning strategies through memory, context, and rote learning practice. Based on qualitative and quantitative analysis, the most frequently used kanji learning strategy in the JFL classroom was rote learning, while context based strategy was used the least among all the categories. Majority of JFL instructors value rote learning as an effective strategy for kanji Acquisition. Rote learning consists of the activities such as frequent quizzes, drills and writing kanji repeatedly, which is also a traditional practice among native speakers of Japanese. Additionally, as the authors conclude, further research is necessary to investigate the function effect of rote learning, and how well it works as a major strategy in the JFL classroom (Shimizu and Green, 2002).

Hathhotuwa Gamage (2003b) investigated JFL learners’ perceptions of usages and effectiveness of kanji learning strategies, examining the three main strategies used in the JFL classroom: “shape (visual strategies), meaning (semantic strategies), and pronunciation (phonological strategies)” (p. 8). In order to assess students’ insight of kanji learning strategies, Hathhotuwa Gamege (2003b) created questionnaires that were influenced by Bourke’s Strategy Inventory for Learning kanji (as cited in Hathhotuwa Gamage, 2003b, p. 6) as a qualitative approach. In addition, a total of 116 participants’ responses were collected, consisting of 64 participants from non-kanji background and 52 from kanji background. The questionnaires were categorized into the strategies that related to the kanji’s shape, meaning, and pronunciation. The mean scores of each
strategy’s usage and effectiveness were compared. The results indicated that there was a high correlation between strategic usage and efficiency, which confirms that the learners use strategies to retain kanji knowledge. Furthermore, the results also indicated that the strategies that associate with kanji sounds (retention of kanji by grouping same or familiar pronunciations) were least preferred among JFL learners. Whereas rote learning strategies, such as writing kanji on a piece of paper repeatedly while obtaining the meaning and pronunciation were the most preferable and effective for JFL learners (Haththotuwa Gamage, 2003b).

In addition to the fact that rote learning strategy is primarily practiced in JFL classroom, Jackson and Tomioka (2004) bring an interesting point for kanji acquisition process using the rote learning strategy:

Rote learning or memorization is essential to becoming ‘Japanese’...the learning of our ‘mother’ or ‘native’ tongue is inextricably associated with our learning of culture-specific core assumption. This basis in language and associated assumptions and values allows us to take part in the communication of information which is essential to being accepted in our culture-specific reference groups, be they national, organizational, departmental, or centered on family, school or friends. (p. 87)

Although this concept is deeply rooted in the Japanese exclusive and inclusive concept, “Soto and Uchi culture,” it is questionable that the idea of becoming ‘Japanese’ or learning of mother tongue is vital in JFL classroom. However, learning kanji through repetition is the way native Japanese have practiced (Heisig, 2008). Nevertheless, it is important to consider the practical reason why the natives practice in a certain way.
There are various kanji teaching and learning strategies suggested, each of which has its own characteristics and objectives for learners to improve particular kanji knowledge. Cook, Hijihara and Tahara (1997) support the use of combined strategies, noting that “all types of information including orthographic, phonologic, and semantic, appear to be involved in processing Japanese kanji” (p. 53). Since kanji acquisition is a cognitive process, various strategies need to be addressed with the integration of other language learning abilities.

**Issues in Kanji Acquisition in the JFL Classroom**

While various strategic studies on JFL learners’ kanji acquisition were examined, relatively few of them produced conclusive implications in learning kanji. Rather, the studies seem to suggest that the combinations of multiple strategies might be the most effective for learning kanji. Furthermore, the evidence from the empirical research in natural learning settings needs to be addressed more. In addition, whether it is recognition or production of kanji, the instructors must also be aware of the individual learners’ needs and expectations of how much kanji they need to learn.

**Structural Difference in Reading and Writing Kanji.** When the learners are engaged in producing kanji in written texts, the understanding of kanji orthography plays an important role. In general, recognition is easier than production in any language, however kanji in particular, with the graphics containing multiple strokes and complexities of the components assembly make it even harder to retain not only for JFL learners, but also for native speakers of Japanese (Chikamatsu, 2005). Grainger (2005) highlighted the differences in reading and writing Japanese, stating that the distinction was “structural” (p.331). Mitamura and Mitamura (1997) addressed the difficulty in
learning kanji, arguing that the acquisition of two language disciplines, spoken and written Japanese, are distinct. Thus, the learners of Japanese require additional efforts for the mastery of kanji (Mitamura & Mitamura, 1997).

Although individual learners establish strategies that are suitable for them, it seems that the different types of strategies need to be addressed at least between recognition and production processing of kanji. According to Shimizu and Green (2002), JFL learners tend to consider “writing kanji slightly more difficult than reading it” (p. 237). This might be because the curriculum itself focuses on speaking and the recognition of the texts rather than producing kanji in the written texts.

**Motivational Difficulties in Learning Kanji.** Students’ motivation is an important key to contribute to a successful language learning experience. As for learning Japanese as a foreign language, it is not an exaggeration to say that the most challenging part of kanji acquisition is how well learners can preserve kanji in their long term memory. The form of kanji and its orthography are the most difficult for students especially for learners of a non-kanji background (Van Aacken, 1999). Compared to the alphabetic writing system, kanji might be a big burden for JFL learners.

Douglas (n.d.) discusses an issue in kanji learning in the JFL classroom from students’ perspectives, pointing out that “the learners in an advanced-level do not feel the size of the kanji they have learned from elementary level has been expanded” (Douglas, n.d., Affective Factors section, para. 1). Similar to the idea presented, students in advanced level courses expressed difficulties in learning and preserving kanji, based on the qualitative survey given to different level JFL courses (Asaoka, 2009).
In fact, Matsumoto (2007) investigated both negative and positive motivational factors among JFL learners in five different universities in the United States; 128 responses from survey questionnaires were analyzed in this study, with 21.9% of JFL learners feeling discouraged when they did not see any progress, contrary to their expectation and efforts. The second factor of negative motivation was caused by kanji learning, with 15.6 % of respondents indicating that constant rote memorization of many kanji was eventually discouraging to them (Matsumoto, 2007).

As it was mentioned earlier, rote learning strategies are still widely used among both teachers and learners to learn kanji orthography (Mori et al., 2007). While Matsumoto’s (2007) studies indicate the negative aspects of rote-memorization of kanji from the learners’ point of view, it does not link to the overall ineffectiveness of rote learning strategies with statistical evidence. Matsumoto (2007) further suggests that kanji learning in the JFL classroom needs to be more interesting and creative so that learners can gain intrinsic motivation (Matsumoto, 2007). It is important to see the effectiveness of rote learning is dependent on different contexts and objectives, and it would be beneficial if rote learning was done in accordance with the additional strategies that would help gaining learners’ intrinsic motivation.

**JFL Learners’ Kanji Error Analysis.** Not only do learners find it difficult to retain kanji as they progress, but they also find it difficult to produce appropriate kanji from memory. Since some kanji share similar orthographical structures, phonology, and semantically ambiguous meanings, the learners sometimes mix up characters, producing errors in the kanji.
Hatta, Kawakami, and Tamaoka (1998) examined handwriting errors in kanji that both native speakers of Japanese (NSJ) and JFL learners made, comparing the various error types and tendencies between the two groups. 374 kanji errors from NSJ group and 408 errors from JFL learners in Australia were collected for the analysis. The error categories were divided roughly into substitution, mixture, and placement-order which were related to kanji phonology, orthography and semantics. The results indicated that NSJ speakers tended to produce kanji errors related to the phonological types at 60% while the JFL learners’ most common errors were the substitution of non-kanji (76%). In this study, what characterized the non-kanji type errors were when kanji had mismatching, dislocated, omitted and added segments to the stroke(s). When non-kanji errors (310 non-kanji errors out of 408) were analyzed, it indicated that 40% of errors consisted of mismatching segments and 32.2% were the errors of addition or omission of stroke(s) (Hatta, Kawakami, & Tamaoka, 1998).

As the authors had argued, the study found that there needs to be more emphasis on the kanji segments in the classroom since close to half of the students’ errors were related to mismatching of segments for both NSJ and JFL learners. They suggested that showing kanji that have the same segments or radicals might help students to reduce mixing errors.

Based on the comparison between NSJ and JFL learners’ typical errors which contain addition or omission at the stroke level, NSJ learners have an error rate at only 7.1 %, while JFL learners were at 32.2%. The difference of the error rates might be described as the learner’s experience of learning kanji and “the different levels of writing skill” (Hatta, et al, 1998, p. 468). While we all understand that the JFL learners have less
opportunity to be in Japanese-only environments in the foreign countries, “the writing skills,” especially at character level, can always be improved through practice.

As for the orthographical related errors of kanji writing, the categorization scheme was both inclusively and exclusively problematic, since errors were solely predicted by researchers’ assumptions. In this study, the orthographical errors (O-type) were defined as “substitution by a configurational and orthographically similar kanji,” for example, the learners wrote 委節 instead of 季節, for the word ‘season’ (Hatta et al., 1998, p. 462). From the data shown, 41 O-type errors were found with the error rate at 10% (Hatta et al., 1998). It remained unclear whether or not these types of errors were substituted because of the similarity in kanji orthography. One thing that was clear from the error was that “substitutions” and categorization were based on researchers’ inference of what learners might have gone through in their mind when they produced an error in kanji. Thus, in order to avoid problematic error categorization, it is important to create precise criterion so that researchers can treat kanji errors based on the observation, and not assumptions.

Chikamatsu (2005) also conducted a similar study, investigating L1 and L2 learners’ kanji retrieval organization patterns along with error analysis. She first examined the categorization of TOP (Tip-of-the-Pen), as she described “as if a kanji character in the word stuck on the tip of the pen and cannot be written accurately” (p. 72). NSJ and JFL learners were asked to answer questions including guessing the shapes and information regarding strokes when TOP happened during production of kanji. The data was categorized into three groups in regards to the accuracy of TOP as well as the correctness of the characters. The results indicated that NSJ had the tendency to guess correct or partially correct characters twice as often as JFL learners. The study also
analyzed the types of kanji errors categorized as phonetic (incorrect but similar pronunciation to the target kanji), graphic (incorrect but similar shape), semantic (incorrect but similar meaning), compositional (incorrectly composed non-target characters in two kanji compound instead of target), and contextual (incorrect but frequently introduced within the context). As for the error analysis, frequency of each error type and the correlation between NSJ and JFL learners were examined. As it was found in the study of Hatta, et al. (1998), there was a significant difference between the two groups in terms of error type. For JFL learners, phonetic (30%) and graphic (27.7%) errors seemed to be the major concern while contextual error was the least (3.7%) (Chikamatsu, 2005).

While the intention of Chikamatsu’s study (2005) was also to investigate whether or not morphological awareness and knowledge of radicals help JFL learners to retain kanji, it is not easy to take the results and apply them to further research since they used different testing materials. The scale of the participants was also small (21 NSJ and 18 JFL learners), which further effected the error types depending on the learning experience and background of the learners as well. Furthermore, the author also noted another limitation of the study, that the classifications of the error types were not “straight-forward” because of “the overwrapping features of kanji” (Chikamatsu, 2005, p. 89).

Studies that include kanji error analysis are considerably few in the field of language learning researches. As it was discussed in the previous two studies, the line that defines error classification is usually obscured since the errors types are diverse, and sometimes overlapping with each other. Furthermore, there seems to be a problem in the categorizational scheme; criteria of kanji errors are often intuited by researchers’
assumptions. Although it is not easy to analyze kanji errors entirely due to the complex features of the kanji system, criteria should be established in order to categorize errors based on the observation.

**New Approach: Integrating Calligraphy Methods into the JFL Classroom**

According to Faerch and Kasper (1980), a language learning strategy is defined as “potentially conscious plans for solving what presents itself as a problem in reaching a particular goal. Learners may attempt to solve problems in second language learning by means of psycholinguistic strategies or behavioral learning strategies” (p. 47). While various kanji learning strategies are employed in the classroom, related issues remain unsolved. Issues in kanji acquisition seem to have multiple facets in both teaching and learning aspects. Systematic disassociation between reading and writing as well as preserving numerous kanji tend to be the serious obstacles, which result in the demotivation of learners. Thus, the difficulties in kanji orthography, motivation to learn, production of kanji errors, and awareness of statistical evidence for the rote learning strategy seem to be the predominant factors. This is where Asaoka (2010) proposes a new approach as a remedy: using calligraphy as a kanji learning strategy in order to maintain learners’ motivation for kanji retention. This approach has not yet been attempted in the JFL classroom since calligraphy is often approached as art in the western perspective. However, in addition to the motivational factor, using calligraphy as an approach and methodology may facilitate learners’ kanji acquisition, in terms of orthographical and proportional development of the characters.

**Calligraphy as a Strategy of Learning Kanji.** Asaoka (2010) proposes a new approach for kanji learning strategy, which is to use calligraphy in the JFL classroom. He
proposed that using calligraphy tools when the learners practice kanji would help them to store kanji easily in the long-term memory. Using brush and ink will cause students to use more sensory activities than just writing by pencil, which may help learners to perceive kanji more smoothly. In addition, the learners may take time and pay more attention to the structures of kanji including strokes, components and balancing, which all contribute to the development of kanji as well as penmanship skills. As far as the motivational difficulty is concerned, the calligraphic approach might be a great way to earn the learners’ interest in kanji retention (Asaoka, 2009). Perhaps, it would be interesting to examine learners’ kanji development by this approach based on both qualitative and quantitative studies.

The goal of Asaoka’s approach of using calligraphy is to impart learners’ motivation. It seems that the reason why rote learning is used frequently in the JFL classroom, the relationship between logographic characters and rote learning, and whether or not the strategy is effective for JFL learners are rarely discussed. One of the reasons why instructors use rote learning is their own experience of using the strategy as learners of kanji.

**Calligraphy Instruction for Language Learning in Japan.** According to Ms. Shigeyo Okada, a consultant for the Toyohashi Elementary School Japanese Teachers Association, the current curriculum of Japanese Language Education in public elementary school includes a calligraphy course at least one class time period per week (S. Okada, personal communication, August 5, 2010). In elementary school, the calligraphy course is usually called shōsha (transcription and copying for handwriting practice) or shūji (penmanship instruction), which focuses more towards the objectives of learning
kanji orthography rather than the art perspectives. Shosha consists of two categories: kōhitsu (pen/pencil writing) which is offered in from the first grade when they are first exposed to kanji characters, and mōhitsu (brush and ink writing) from the third grade and above. Both kōhitsu and mōhitsu instruction are aimed to improve correctness and consistency of the characters (The Japanese Ministry of Education, Culture, Sports, Science, and Technology, 2010, p. 108).

Another goal of shosha instruction is to generalize penmanhpship skills into the daily routine, and establishing and maintaining character’s correctness, the focus here again being consistency (The All Japan Association of College Shosa-Shodo Education, 2006). Under this agenda, the learners will be focused on the balance, shape, size, and position, of the characters. They will also look at intersection of the strokes and components to understand the structure of kanji. And then, the learners will take a look at the overall association and consistency of the characters within the sentences.

For the practical methodology used in the kōhitsu writing course, the learners are often given specialized sheets that are to be used to practice writing the letters with. The pages are lined vertically with square boxes that the students are supposed to fill in and practice transcribing characters again and again. This kanji Practice Book methodology is considered to be the typical and traditional representation of rote learning; however, the potentiality of this practice is also to facilitate students’ penmanship ability using specialized sheets.

**Kōhitsu Rote Learning Method for Kanji Error Improvement.** In the field of kanji acquisition research, statistical evidence in which rote learning strategy best works in the JFL classroom needs to be further investigated. In the study of Shimizu and Green...
rote learning strategy includes practices such as, frequent quizzing, repeated writing, and practice drilling of kanji. However, there is another aspect of purpose and objectives of the rote learning which is considered to be valued in the language learning classroom in Japan. The purpose of the rote learning is believed that the learners will retain kanji in visual memory by practicing and tracing strokes of the characters repeatedly. However, different types of rote learning methodologies are also integrated into calligraphy courses, in order to improve learners’ penmanship. By practicing in specially formatted paper, the learners will strictly need to copy and trace the calligraphic samples, which help basic learners to get the form and proportion of the characters.

In terms of the research on error analysis, current studies have focused on the errors in terms of phonology, semantic, and the substitution of orthographically similar kanji (mixed up). However, there are only a few studies that have focused on learners’ kanji shape, and orthographical and proportional errors of kanji. Before moving on to the methodological procedures of the kanji orthography improvement, it is important to define what constitutes incomplete kanji as well as the errors at greater degree. Kanji errors observed in the previous study of Hatta, et al. (1998) were visually identifiable, since the errors were defined as a misproduction of target kanji characters. Furthermore, the error analysis found in Chikamatsu’s study, which examined L1 and L2 readers’ memory and retrieval system through kanji writing, only used 135 “real character errors” while a total of 217 characters were identified as errors (Chikamatsu, 2005, p. 83). The other 82 characters were silent in their study; however, it is possible to consider that those errors might fall in between the obscure definition of what makes an error.
In the field of cognitive psychology, it is hard to determine the “line” of the error especially in terms of handwriting. For instance, as Somers (2005) argues, “while some of the things that learners write are unquestionably errors, for often things are not so clear-cut” (Somers, 2005, p. 153). In order to touch up on the “unreal” aspects of hand written characters, it is essential to overview the expectation of Japanese penmanship, in order to evaluate the learners’ improvement. Thus, the present study will investigate JFL learners’ issues in the production of kanji in terms of its orthography and proportion of the characters.

**The Present Study.** Based on the findings discussed throughout this chapter, the present study examined JFL learners’ kanji production, first analyzing to see what kind of kanji errors were observed in JFL learners’ hand-written kanji compound words. The study then investigated whether or not JFL learners improved their penmanship in terms of proportion and spacing at the character and component level. This was done by giving two different inputs and materials for practicing kanji when learners were first introduced unknown kanji compound words in the following chapters. The first input was provided using traditional instruction with note-type practice sheet. Then the other input included kōhitsu instruction: one of the basic calligraphic instructions. A kanji test was given to the participants after a week of practicing kanji in each kind of materials. Based on the text analysis in two kanji tests, the correctness of the target kanji compound words were coded in order to see the occurrence of the improvement by statistical comparison.

Finally, the present study will investigate whether or not there is any effect when JFL learners use specialized kanji sheet for practicing kanji. To seek answers to these research questions, chapter two will overview the detailed research procedures and methodologies.
Chapter Two  
Methodology

Introduction

In the previous chapter, it was argued that kanji is taught intensively in the advanced level JFL classroom in a variety of ways, therefore, many kanji learning strategies have already been introduced and critiqued by both instructors and students. The issues related to kanji-learning have been discussed in the previous chapter, however, many remained unsolved. The issues covered tended to be more from the learners’ point of view, revealing that JFL learners have motivational issues in learning and retaining kanji. Furthermore, JFL learners’ kanji error analysis was also discussed; however, the research tended to have limitations which made the results debatable. As for learning strategies used in the classroom, the primary method that the majority of the instructors use is rote learning. Therefore, it is of interest to find out whether the rote learning strategies improve some aspects of the learning, comprehension, and retention of kanji.

The objective of this study is to investigate the effects, issues, and improvement (if any) on JFL learners’ kanji production. The objective of this study is also to: 1) determine what problems and errors in particular are observed in their written kanji and 2) to see if there is any improvement in their kanji production when they use specialized kōhitsu kanji practice sheets.

Participants

In the first session of the study, 17 learners of Japanese as a Foreign Language (JFL) participated. However, 3 students from the first session were absent in the second session; therefore, a total of 14 participants (3 female students and 11 male students)
were selected for the final data analysis. All the participants are currently enrolled in an advanced Japanese course at the University of Toledo. Since the present study deals with learners’ hand-written kanji production, all the information regarding this research was concealed to the participants. In another words, the participants were unaware of the procedure of this study. This was done so that the researcher could successfully collect the data for analysis in an unbiased environment.

The present study had a single criterion for recruiting participants, which was that they had to be advanced level JFL learners. At this time of the research, the university offered eleven Japanese sections at different levels, and the targeted class was at the highest level. Since this study also analyzes JFL learners’ kanji errors, it is also essential to overview the learners’ background in learning Japanese. Further details are presented below.

**Participant Selection.** Currently the Japanese program at the University of Toledo offers several courses each semester from language to culture, and business to history. Many students are interested in Japan’s rich culture and unique language; in fact, the current Japanese Program has one of the fastest growing numbers of students’ enrollment in the foreign language department. As of 2010, there is a 34% enrollment increase since 2009 (J. Hara, personal communication, January, 2011). Most of the students have no background in learning Japanese and it is quite a challenge for students to grasp the complex orthographic system. Within a limited amount of time throughout the semester, students are required to learn how to speak, listen, read and write. While the current textbook used in the program tends to focus more on speaking, and not much on writing; kanji instruction faces great challenge for students in JFL classroom. In the
first semester of the elementary Japanese course, students are required to master both Hiragana and Katakana. In the second semester, students are exposed to several basic kanji for the first time. And by the end of the fourth semester, students are expected to be familiar with roughly 250 kanji vocabulary words from the text (J. Hara, personal communication, December, 2010).

While over 240 students are enrolled in the language courses, it was challenging for the author to select which level of participants would be most desirable for this study. Even though the students in the intermediate courses were technically qualified for the research, there was a concern that students may not be familiar with the structure of kanji to greater degree, including its meanings, associated speech such as on-/kun-reading, as well as the kanji recognition and production. Since this study involves a detailed analysis of kanji production, it was necessary for the researcher to recruit advanced level students in order to exclude errors related to the unfamiliarity and limited knowledge of learning kanji.

**Participants Backgrounds.** Since this recruited course was a 4000 level course, participants would have already taken at least six JFL courses prior to this class. They would have received at least five semesters of kanji instruction within those Japanese classes, more intensively in the fifth and sixth semester’s composition courses.

The present experiment was carried out at the very beginning of the spring semester, in January 2011. This course had a prerequisite, requiring students to have taken the previous session, which was offered in the fall semester of 2010. Therefore, all the participants in this experiment were registered in the previous session in fall 2010, using the specially designed course pack materials. The participants learned chapters 1 to
7 in the previous session in the fall semester, and then continued to cover chapters 8 to 9 plus translation tasks in the following semester.

Each chapter of the course pack contains thematic readings and comprehension questions. Composition tasks are normally assigned to the learners after the reading tasks. During the class, the instructor reviews key vocabulary, mostly the complex kanji compound words before reading task is assigned. While some of the individual kanji in those compound words are retrieved from what the students have already learned in previous Japanese courses, the instructor would demonstrate the structures of kanji by tracing the stroke order and their meanings. Each chapter contains an average of 15 to 20 kanji key vocabularies, and learners are all required to take a kanji vocabulary test after the chapter is accomplished. The participants in this study have already learned and tested from Chapter 1 to 7 in the previous semester, thus the present experiment deals with Chapter 8 and 9 of the course pack. The detailed procedural data collection tasks will be discussed as follows.

**Test Procedures**

The two main concerns of this study are analyzing JFL learners’ hand written kanji by investigating the presence of the orthographical kanji errors and examining whether or not kōhitsu calligraphic materials helps JFL learners to improve the issues that are observed in the first analysis. Thus, this study consisted of two sessions: Traditional input (Chapter 8) and Kōhitsu input (Chapter 9). In each session, participants received different materials to practice their kanji both in-class and as a homework assignment. They then took part in a kanji test for each chapter. The presence of improvement in both
sessions was examined by analyzing the number of cases of kanji errors in the two kanji tests.

**Traditional Input (Chapter 8).** For the first session, the participants received instruction on kanji vocabulary words in Chapter 8 of the course pack. In this chapter, fourteen new kanji compound vocabulary were introduced as key-words in order to comprehend the following reading. Since the theme of the reading was “Wedding Season,” the key kanji words had a lot to do with marriage and religious thematic vocabulary. This session was termed “Traditional Input” since the same method was used from Chapter 1 to 7 throughout the previous course in Fall, 2010. The participants received instruction from the book, which had a list of key thematic kanji vocabulary in the first page of the chapter. They were also required to have taken kanji tests in each chapter. The first session of the present study, which is termed Traditional Input, followed a similar methodology. However, the participants received a handout that provided the exact same list of fourteen kanji vocabulary in Chapter 8 for the present study. In addition, the handout provided horizontal note-lines next to the vocabulary words they studied (see appendix A). The participants were asked to write down each kanji one time when they received instruction from the instructor. The use of the handout was to control the effect of participants’ opportunities to practice kanji during the input. After completing fourteen kanji, the participants were then given the homework assignment using the exact same handout and asked to practice that vocabulary additional five times. The instructor also announced in class that there was an extra handout attached to the assignment for anyone who wished to practice more than five times to prepare for the test. The extra practice paper was attached in order to limit the possibilities of having the participants write down
in a different paper rather than the traditional method. The session ended after those vocabulary were introduced, and the participants were also notified by the instructor that there would be a kanji test on Chapter 8 for the following week. All the participants turned in the homework on the day of the kanji test. While all of them had practiced the newly learned kanji vocabulary words at least five times, none of them had used the extra handouts.

**Kōhitsu Input (Chapter 9).** After completing Chapter 8, which covered the traditional input, the participants then moved on to Chapter 9 in the course pack. In this session, the participants received kōhitsu instruction as an input of sixteen kanji key vocabulary items. During the input, the participants were provided with the specialized kanji practice handouts filled with the grids. Each grid contained a vertical and horizontal dotted line in between, which would help the learners to identify where to start and end the strokes of kanji. Sixteen key kanji vocabulary words were written precisely in the grids as the samples (see appendix B), and the instructor introduced its stroke orders by tracing the samples on the grids using a document camera. The instructor then asked all the participants to write them down in grids once. After the input of the sixteen vocabularies was performed, the participants were provided with the same handouts to practice the newly learned kanji vocabulary words five times as a homework assignment. As well as the previous traditional input, the students were also provided with extra handouts for those who wished to practice more for the test. The instructor also notified the participants that there would be a kanji test on Chapter 9 in the following week, and also asked learners to turn in their homework the same day. All the homework assignments were collected after one week of the input, except for those of the three who
were absent in the day of kanji test. Once again, those three were not included for the final analysis of this study. Both Traditional and Kōhitsu Input took approximately about 30 to 35 minutes.

**Kanji Test.** After Traditional and Kōhitsu of targeted kanji compound words were introduced, a kanji test was provided to the students. In order to avoid unfairness of the time span and the participants’ quantity of the kanji practice, the researcher made sure to schedule kanji tests after one week so that the participants had equal amount of time to study for the kanji tests for both chapters. In addition, the students were also required to turn in homework on the same day as the kanji test, so that they all had equal amount of time to practice writing target kanji vocabulary. Kanji Test A contained all the fourteen kanji vocabulary items from Chapter 8 (see appendix C), which was given seven days after the Traditional Input. Kanji Test B contained all the sixteen vocabulary items from Chapter 9, which was also given to the students seven days after the Kōhitsu input (see appendix D).

Both kanji tests dealt with the same kanji vocabulary from both chapters with the exact same orders as they were written in both the course pack and the handout. The participants were required to write down all the kanji vocabulary on the horizontal lines next to the appropriate translations for both tests. The translations of all the kanji vocabulary items were provided in the course pack, and it was also available to all the students. Regardless of the different types of the input, the structures of both kanji tests were the same. The main focus of this study is to investigate the effect of the students’ handwriting rather than how well they perform the exam; thus, the order of kanji vocabulary was kept just as it was in the course pack and handout.
Data Coding

Before the Kanji Test A and B were collected for data analysis, four kanji compound words from the vocabulary list were selected for the second text analysis. The selection criterion was first to sort out all the vocabulary items by the structure of radicals and components, and then pair them up with the vocabulary items that had the identical or similar structures in Chapter 8 and 9. As it is shown in the example structure in Figure 1 below, both kanji compound words in Chapter 8 and Chapter 9 share the same structure (two kanji compound word).

<table>
<thead>
<tr>
<th>Example Structure (Two kanji Compound Word)</th>
<th>Chapter 8</th>
<th>Chapter 9</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Example Structure" /></td>
<td>神主</td>
<td>私立</td>
</tr>
</tbody>
</table>

*Figure 1. Pair-Kanji Item Selection.*

“Kanji Errors” in this Study. The biggest challenge that the researcher faced in the present study was to determine what kanji are categorized as proportionally and orthographically erroneous and what constitutes the criteria for the determination of its improvement. When it comes to the improvement of individual’s handwriting, it is very difficult to define what is acceptable and what is not. If the focus of the research was to examine kanji errors that were produced mistakenly by being substituted, added, or omitted, it would not be difficult to identify and categorize them as “complete” errors. However, the present study deals with kanji errors in terms of penmanship. And thus, it was important for the researcher to provide detailed criteria in order to define what constitutes an error in this study. Thus, this study consists of several criteria to first
examine the presence of the errors, which deal with the proportion and orthography of kanji compound vocabulary.

**Proportional Errors.** Based on the observation in the first input and pre-text analysis, several issues were identified from the JFL Learners hand written kanji production. Since the participants are exposed to complex kanji characters that contain an average of ten strokes or more, they seem to struggle with characters’ consistency in sizing and spacing (see Figure 2).

<table>
<thead>
<tr>
<th>Kanji Error</th>
<th>Level of the Kanji Error</th>
<th>Target Structure of Sample Kanji</th>
<th>Sample Kanji Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inter-Character Proportion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inter-Component Proportion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spacing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inter-Character Spacing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inter-Component Spacing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unrecognizable Components</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Character Component</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Figure 2. Criteria of the Kanji Errors.

As the examples show in Figure 2, some participants wrote the characters bigger or smaller than the neighboring characters, which resulted in losing balance with other characters. Similar issues were also observed at a character’s component level as well,
which were also causing imbalance of an overall proportion of the character. This might be considered due to the writer’s difficulties in writing more complex-stroke characters and components than less stroke characters/components.

**Spatial Errors.** In addition, the issues of the characters’ inter and intra spacing (See Figure 2) were also observed in this study; some participants have random and inconsistent spaces between characters and components. This is thought to be another issue that causes orthographical problems in kanji words since these inconsistent spaces sometimes obstruct the readers’ ability to recognize the characters, which may also result in interfering with the understanding the meaning of the vocabularies.

However, unlike the proportional error cases, spatial errors in kanji compound words sometimes depend on the context. In general, a kanji is a character that consists of one component of a radical and one or more components. While some radicals and components are also constituted as individual characters themselves, the spacing between components cannot be greater than the spacing between the characters within the compound words. For instance, suppose that we take the space between a character as Inter-Character Spacing and the space between components as Inter-Component Spacing, the quality of the Inter-Component Spacing should be smaller than the quantity of the Inter-Character Spacing since the component space is always smaller than the character space. If Inter-Component Spacing is greater or equal to the value of Inter-Character Spacing as it seen in Sample 2 in Figure 3, the radicals and components would look too separated to constitute as a character (see Figure 3). Although the quantity of the Inter-Component Spacing is equal in both samples in Figure 3, the coder(s) must always look at the value of Inter-Character Spacing. As is shown as an example in Figure 3 below,
Sample 2 would be categorized as an Inter-Character Spacing Error while Sample 1 would be considered errorless.

![Diagram](image)

*Figure 3. Samples of Inter-Character (y) and Inter-Component (x) Spacing.*

In sum, four elements of kanji errors: Inter-Character Proportion (CHP), Inter-Component Proportion (COP), Inter-Character Spacing (CHS), and Inter-Component Spacing (COS) were used for the final text analysis. In addition, other type of errors related to kanji components were also recorded under the Unrecognizable Components category for further discussion.

**Coding Items from the Kanji Tests.** In order to assess an individual’s handwriting holistically without having biases, there is a need for second coder who does not know the purpose of this research. Therefore, in addition to the author being a coder, another graduate assistant (Joshua Paiz) from the University of Toledo volunteered as a second coder. The second coder has experience in learning Japanese for about four years, and holds a certification from the Japanese Language Proficiency Test. Based on the second coder’s sufficient knowledge of various kanji in accordance with the criteria for classifying kanji errors, items from both Kanji Test A and B were precisely coded for a statistical analysis. With reference to the criteria shown (p. 27, Figure 2), the errors in items from the kanji tests were analyzed using SPSS.
Data coding was done at the graduate lab in the University of Toledo. Four selected pairs of kanji compound words in both tests were analyzed based on the presence of the errors from the criteria. For example, if the item contains an error of the character proportion (CHP) but not in the component proportion (COP), 0 points were coded under the CHP category and 1 point was coded under the COP section. An item that received 2 points for the criterion of proportion and 2 points for spacing was judged correct and well-written in terms of kanji production.

All the data was directly coded into SPSS by the two coders. At the end of the coding process, a total of four pairs of kanji compound words (total of 8 vocabulary items) in Chapter 8 and 9 were coded into four different valuables. Since this study included 14 participants, a total of 14 samples were collected overall. With reference to individual participant improvement, a paired samples t-test was used in order to investigate the effect of kōhitsu instruction and practice, by comparing scores evaluated based on the presence of the proportional and spatial kanji errors.
Chapter Three  
Results, Discussion & Limitations  

Introduction  
The previous chapter discussed the research methodologies in terms of JFL learners kanji production in two different contexts. This chapter will overview the results based on the statistical analysis using SPSS, performing paired samples t-tests on each of the four items. Based on the given results, an interpretation of the original research questions will be presented. This chapter will conclude by discussing limitations and possible implications of the findings, as well as providing suggestions for future research.

Results  
In this study, four matched items of kanji compound words were selected from the two kanji tests given to the students, and then compared using statistical analysis. Each item had four categorizations in terms of character proportion/spacing and component proportion/spacing; thus a total of 32 variables were coded onto an evaluation sheet by two scorers. The coding was taken place independently so that there was no negotiation in making decisions between two scorers while performing this task. As it was also discussed in the previous chapter, the scorers evaluated all of the four items holistically by giving 1 point for each aspect of correct writing, 0 points for items containing errors. When there was a disagreement between the two scorers in certain items, it was coded as 0.5 points on that aspect. This was done because the items which were evaluated as having an error by a single scorer should not be ignored, since the evaluation was made based on the strict error criteria. Rather than having the two scorers negotiate the data until they reach an agreement, the author attempted to treat both evaluations equally.
Overall, 52 out of 448 data (32 variables with 14 samples) were disagreed upon between two scorers, which yields an 88.4 % inter-rater reliability.

As it was stated above, paired samples t-test between four matched items were compared in order to analyze a possible improvement on the scores between Kanji Test A (Chapter 8) and Kanji Test B (Chapter 9). For instance, the comparison between Item 1 in terms of its character proportion in both Chapter 8 and Chapter 9 would be presented as the improvement in character proportion in Item 1. The same procedures were used for the comparison regarding component proportion (COP), character spacing (CHS), and component spacing (COS) for all four Items. The following section will discuss the kanji compound items and the improvement (if any) observed between the two chapters.

**Kanji Compound Words: Item 1.** For Item 1, “新婚旅行 (shinkon ryōō)” in Chapter 8, “修学旅行 (shūgaku ryōō)” in Chapter 9 were matched and compared for analysis. These two words were matched based on the similarity of the characters’ relative complexity and combination. Each item obtained four individual kanji characters which shared two identical characters 旅行 (ryōō). This was the only item that contained four kanji characters out of all the items in the present study.

The results from paired samples t-test first indicated that there was no improvement observed in terms of character proportion in Item 1 (p = 0.794). However, comparison between the component proportion showed a significant improvement between the two samples ($\bar{X}_{\text{COP8}} = 0.1923, \bar{X}_{\text{COP9}} = 0.5000, n = 13, t = -2.551, p = 0.025$).

Similar results were observed in the comparison of the character spacing; significant improvements were observed ($\bar{X}_{\text{CHS8}} = 0.3846, \bar{X}_{\text{CHS9}} = 0.8077, n = 13, t = -2.513, p = \ldots$)
In terms of the component spacing, errors were significantly improved as well 
\( \bar{X}_{\text{COS}8} = 0.2308, \bar{X}_{\text{COS}9} = 0.9231, n = 13, t = -5.196, p = 0.000 \).

In sum, paired samples t-test indicated that in the following three criteria —
component proportion, character spacing, and component spacing — Item 1 improved 
significantly in Chapter 9. On the other hand, the results showed that the character 
proportion did not show any significant improvement.

**Kanji Compound Words: Item 2.** Item 2 dealt with kanji compound words which included two kanji characters; 花婿 (hanamuko) in Chapter 8 and 生徒 (seito) in Chapter 9 were used for Item comparison. Both compound words share a similar structure; the first character is a relatively less complex kanji while the second character is a kanji that consists of two components with similar number of strokes. Both Items were compared using the same research procedures based on the four criteria examined in Item 1.

Interestingly, the results appeared to be quite different from the case observed in Item 1. In Item 2, there was no significant improvement in the character proportion \( (p = 0.795) \). On the other hand, the component proportion seemed to improve significantly based on the comparison between Kanji Test A (Chapter 8) and Test B (Chapter 9) \( \bar{X}_{\text{COP}8} = 0.0833, \bar{X}_{\text{COP}9} = 0.6667, n = 12, t = -4.841, p = 0.001 \). Nonetheless, in terms of character spacing \( (p = 0.256) \) and component spacing \( (p = 0.555) \), no significant improvements were observed.

Out of the four criteria, only the component proportion in Item 2 showed a significant improvement in Chapter 9. While the other three criteria: character proportion,
character spacing, and the component spacing did not show any significant improvement in related errors.

**Kanji Compound Words: Item 3.** For Item 3, “神主 (kannushi)” in Chapter 8 and “私立 (shiritsu)” in Chapter 9 were chosen for the comparison. Both kanji compound words contained two characters which consisted of two components in the first character, and a less complex one in the second character. The first kanji in both items have similar structure, which is why they were chosen for matched-pair comparison.

By comparing the mean scores of the two items, neither character nor component proportion showed any significant improvement. The t-test showed no significant improvement in the character proportion ($p = 0.337$) and component proportion ($p = 0.673$). However, in terms of spacing, improvements in Item 3 were observed. At the character level, a comparison of the character spacing errors showed an improvement in accuracy ($\bar{X}_{CHS8} = 0.6154$, $\bar{X}_{CHS9} = 1.000$, $n = 13$, $t = -2.993$, $p = 0.011$). In another words, all the character spacing samples were evaluated “correct” in Kanji Test B (Chapter 9). Similarly, the component spacing were also significantly improved ($\bar{X}_{COS8} = 0.4615$, $\bar{X}_{COS9} = 0.8846$, $n = 13$, $t = -3.395$, $p = 0.005$).

Overall, paired samples t-test indicates Character Spacing and Component Spacing were improved significantly in Chapter 9, while improvements in Character Proportion and Component Proportion appeared to be insignificant.

**Kanji Compound Words: Item 4.** Item 4 was again pair-matched based on kanji which contained a relatively similar numbers of strokes and similar structure of components. “神社 (jinjya)” for Chapter 8 and “制服 (sēfuku)” for Chapter 9 were
selected for the comparison. As stated above, all the characters contained two longitudinal components within a character.

Based on the paired samples t-test, no significant improvements were observed in both the character proportion \((p = 0.269)\) and the component proportion \((p = 0.368)\). However, the character spacing seemed to be significantly improved in Chapter 9 \((\bar{X}_{CHS8} = 0.6250, \bar{X}_{CHS9} = 9583, n = 12, t = -2.602, p = 0.025)\). But once again, in terms of the component spacing, no significant improvements were noted \((p = 0.389)\).

Out of all the four criteria for kanji errors in Item 4, only the character spacing showed significant improvement; while the character proportion, component proportion, and component spacing did not show any significant improvement for kanji errors in Chapter 9.

**Discussion**

Based on the results retrieved from statistical analysis, the following section will first discuss and interpret the data by answering the original research questions. Furthermore, the section will address the possible causes and presumed effects which may have triggered the outcome of the present study.

**Research Question 1: What Kind of Kanji Errors are Observed in the Two Kanji Tests?** This study focused on the JFL learners’ production of hand-written kanji; therefore, errors related to the kanji meaning or kanji pronunciation were excluded. Additionally, kanji errors due to an additional or substitution rearrangement with other characters or components were also removed from the data. If a participant produced kanji either partially or entirely varied from the correct kanji, they were categorized as unrecognizable kanji. The researcher’s intention was not to speculate about the
abstraction of how and why the errors were produced in such a way by the JFL learners, but rather to leave out those as unrecognizable, and treat only the observable errors. Out of 448 data points, five errors were excluded from the statistical analysis. Two unrecognizable errors in Kanji Test A (Chapter 8) and three in Kanji Test B (Chapter 9).

The errors that were observed in the present study were the following four: character proportion, component proportion, character spacing and component spacing. These four error criteria were present in all four items in both tests, and it was possible to consider which error criterion was more severe for the JFL learners by comparing mean scores of all the four criteria. The less the mean score was within the item, the more severe the level of the error was for them. Interestingly in Kanji Test A, the t-test showed that the lowest mean scores of all four Items were the component proportion error. As for Kanji Test B, for three of the items, the lowest mean score was the character proportion error, and for one item was the component proportion error. This is considered since two cases (Item 1 and 2) of the component proportion errors were significantly improved in from Kanji Test A to Kanji Test B, while the character proportion error did not significantly improve in any items from Test A to Test B. Nonetheless, a number of kanji errors were present in both kanji tests, and the tendency and characteristics of those errors varied in each test. Whether there is any improvement or not depends on the matched-pairs comparison. Interpretation of the results will be discussed next.

Research Question 2: Do JFL Learners Improve Their Penmanship in Term of the Character Proportion or Spacing or the Component Proportion or Spacing?

The following table summarizes the error improvement between Kanji Test A and B.
Table 1

Summary of the Results of Error Improvement

<table>
<thead>
<tr>
<th>Kanji Error Type</th>
<th>Occurrence of the Improvement (+) Improved / (−) Did not improve</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Item 1</td>
</tr>
<tr>
<td>CHP</td>
<td>−</td>
</tr>
<tr>
<td>COP</td>
<td>+</td>
</tr>
<tr>
<td>CHS</td>
<td>+</td>
</tr>
<tr>
<td>COS</td>
<td>+</td>
</tr>
</tbody>
</table>

As the table above indicates, none of the errors in the character proportion (CHP) in any of the four items improved significantly, while errors in the component proportion (COP) improved in 50% of the Items. Character spacing errors (CHS) seemed to improve the most out of all the categories in this study, showing improvements in 75% of the Items. Component spacing errors (COS), like COP errors, also improved reasonably, that is, for 50% of the items.

Improvement in this study was once again determined by the comparison of the mean scores of the four items from the kanji tests. Kanji Test A was given first after the Traditional Input while Kanji Test B was given after the Kōhitsu Input, practiced on a specialized kanji sheet. Therefore, it is logical to think that the score improvement must be driven by the use of specialized kanji sheet. It was interesting that the errors in character proportion did not improve in any of the items, while errors in component proportion did in half of the items. There could be two possible explanations for the difference in results. One possibility is that the participants in general may have focused more in the internal structure of a particular kanji character by writing in the grids. Those grids in the specialized kanji practice sheet would help students to not only write a
character in a certain space and size, but also to relocate internal structures of components and radicals appropriately by referring to sub-lines inside the grids.

Another possibility can be explained by looking at the occurrence of the improvement in Item 1 and 2. Interestingly, the second character of both Items in Kanji Test A contained the same radical: “女 (female).” It is possible that this particular component might have affected the overall performance of the participants. It could also be considered that the participants found it difficult to write this specific radical proportionally correct for some reason. In fact, the “女” in Item 1 and 2 is the only radical in the data which can also exist as a whole character. JFL learners may have difficulties if they did not have enough experience in prolonging this radical to fit into a balanced character. If this were the case, the mean scores of the component proportion would be lower in Item 1 and 2 just because of the difficulties of the characters that contained “女.” However, in the present study, the participants should have already known the component “女” as a whole character since they had learned this character in the elementary level courses. Thus, whether or not the participants knew this character does not seem to be the primary factor.

**Research Question 3: What is an Effect when JFL Learners Use Specialized Kanji Sheet for Practicing Kanji?** Regardless of whether to include the possibility that the improvement in the component proportion might have been due to the easiness/difficulty of the component, spatial errors seemed to be by far the most affected criterion in this study. In 62.5% of the cases, those related to both character and component spatial errors were significantly improved; this can be taken as a possible positive effect for JFL learners’ hand-written kanji production.
On no item did the score significantly worsen. Overall, 7 out of 16 items showed significant improvement, whereas the other 9 items showed no improvement. Further analyzing the comparison between the mean scores, the errors did not worsen in 7 of the 9 items that showed no improvement. Thus, the effect of using specialized kanji sheet was relatively positive, and overall, JFL learners’ hand-written productions of kanji were improved in certain error Items.

Possible Implications for Teaching Kanji. The present study investigated the effect on JFL learners’ hand-written kanji production after receiving a calligraphy kōhitsu instruction and practice. It revealed that kōhitsu instruction and the use of specialized kanji practice sheet may have played an important role in improving JFL learners’ certain proportional and spatial kanji errors. Although kanji errors in the present study did not deal with the critical errors that conflict the overall understanding of the text, it can be seen giving attention to the writing through the simple use of grids would contribute to the legibility of one’s hand-writing. Most of the textbooks used in JFL classrooms introduce new characters with the grids for writing practice especially in the elementary level; however, the use of grids seems to be lessened as proficiency level increases. It may be still beneficial to apply this method in advanced level courses since they are dealing with more kanji as they move on to upper level courses.

Instructors must not assume that the learners have already acquired decent understanding of kanji orthography, but rather should help learners writing them carefully so that they may be able to avoid proportional and spatial errors of kanji. Currently, Shimizu and Green (2007) indicate that the rote learning strategy is still used most frequently in JFL classroom for learning kanji. While Matsumoto’s study (2007)
highlighted the JFL learners’ de-motivational aspect of rote learning for memorizing kanji, the author further attempted to improve on the positive element of this strategy by integrating calligraphy into the JFL classroom.

**Limitations and Future Research**

While the results may have shown that kōhitsu instruction had improved kanji production, this section will discuss the limitations of the study in terms of the research methodology. The chapter will be concluded by reflecting on those limitations and other interesting findings for possible future research.

**Framework of the Research.** Although the present study showed statistical improvement of JFL learners’ hand-written kanji production, it must be emphasized that some elements in this study might have impacted the overall outcome. First, the sample size used in the present study was not large enough to assure a completely convincing outcome. A total of 14 JFL learners were recruited for this study, therefore, the occurrence of the error improvement was only measured within these 14 learners’ samples. Unfortunately for the present study, only 14 students who had accomplished the prerequisite course in the previous semester registered in the advanced level course at our University. For future research, it would be suggested to include more participants in order to show stronger evidence for JFL learners’ error improvement.

Another possible impact is that even though the size of the data coded for error analysis seemed relatively large containing a total of 448 single criteria, it again included only four pair-matched kanji vocabulary items. Since the researcher sensitively focused on the environment in which this study was to take place in, the samples were retrieved from the original course materials. The outcomes of the error improvement must have
been strengthened if the paired items were identical in all key aspects in both chapters. However, the present study could not find vocabulary items in Chapter 8 and 9 of the course pack that matched in all desired criteria. Instead, only the number of strokes and similarity of structures could be taken into account for the comparison.

The time span for practicing kanji is also one of debate. In the present study, both Traditional and Kōhitsu Input were done within the class time period, and the participants were asked to write down kanji using different types of practice sheet for the period of one week. Here again, the research had taken place in accordance with the course schedule, therefore, it was only limited to one week for practicing kanji before the weekly kanji test was given to the participants.

Disagreement between Two Scorers. While the two scorers had enough training in evaluating collected Items independently, 88.4% of inter-rater reliability might be perceived as relatively low agreement. In Chapter 8, 40 % of disagreement was related to proportional errors, while 60 % were in terms of spatial errors, whereas in Chapter 9, 70% of disagreement was related to proportional, while only 30% of disagreement was on spacing.

Although 11.6% of the evaluation was disagreed upon, it seems critical to first identify the level of the disagreement between the two scorers. When the first scorer evaluated an Item correct (1) for both character and component proportion or spacing, while the second scorer evaluated as both incorrect (0), then this case is a clear disagreement between two scorers. On the other hand, if the first scorer evaluated correct (1) for the character and incorrect (0) for the component while the second scorer did incorrect (0) for the character and correct (1) for the component, then this disagreement is
no longer about the presence of the error but rather an analytical disagreement about the nature of the error. In both of the chapters, 19.2% of the disagreement was of an analytical level.

When the disagreement was examined closely in regards to each item, most of the disagreement happened especially in Item 2 and Item 3. When recalling the structure of kanji compound words in both items, it shared almost the same functions. One assumption might be considered is that the idea of jikubari might have affected in evaluating one’s writing. Jikubari is a penmanship treatment in negotiating characters’ size, position, and alignment in order to keep a balance within entire phrase or sentences. For instance in Item 3, each character in “私立 (shiritsu)” looks the same in sizing; however in written Japanese, less complex kanji, “立” in this case, can be written smaller than “私立.”

As for the disagreement in terms of spatial errors, it can be assumed that even though the space between the characters is greater than the space between the components, kanji items may still look awkward if the space is too big. Perhaps the disagreement on the spatial errors, especially in Chapter 8, can be described based on the assumption above. Although there were strict criteria to determine whether the character/component was correct or incorrect, the scorers were sometime required to evaluate spatial aspects subjectively based on their knowledge of kanji and the Japanese writing system in general.

**Future Research.** For future research, it would be interesting to see the effect and error improvement of JFL learners’ hand-written kanji production with reference to those limitations discussed previously. Ideally, bigger sample size would ensure the outcomes
more significantly. It would also be beneficial to include a larger scale of pair-matched kanji vocabulary items with a variety of other kanji components. If the research’s focus is solely to evaluate one’s error improvement based on the identical kanji samples, two groups can be recruited for the text comparison. In this case, the control group would receive Traditional Input as well as the note-type kanji practice sheet, while the experimental group would receive Kōhitsu Input and specialized kanji practice sheets.

In addition, as it was discussed in the section under the Research Question 2, further research is necessary to investigate the effect on JFL learners kanji errors when the sample contains kanji component which could also constitute the whole character. Following Figure 4 shows some examples of the components which constitute as a whole kanji as well as other components which do not.

<table>
<thead>
<tr>
<th>Component Type</th>
<th>Component (Left Radical)</th>
<th>Same Component as a Whole Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>Component which also exists as a character</td>
<td>娘、眠、桜、鮮</td>
<td>女、目、木、魚</td>
</tr>
<tr>
<td>Component which does not exist as a character</td>
<td>河、体、祈、技</td>
<td>水、人、示、手</td>
</tr>
</tbody>
</table>

*Figure 4. Component Type.*

Based on the results presented in this study, it could be hypothesized that the error rate might get higher if kanji characters contain radicals which can also constitute a whole kanji. The reason could also be assumed that the JFL learners did not have enough exposure to the particular component’s proportional differences in both the radical and character. This hypothesis can be examined by comparing kanji characters which contain both types of components.
Finally, the present study analyzed JFL learners’ kanji errors in terms of proportion and spacing, investigating the occurrence of the improvement according to these two criteria. Since the participants had written kanji again and again in different kanji practice sheets, the strategy used in this study can be identified as a variation of the rote learning method. Although the present study does not show any statistical evidence of retaining kanji, the results do suggest possible evidence of improving learners’ orthographical errors of kanji when they used specialized kanji practice sheets combined with the rote learning method. Considering the motivational and orthographical issues JFL learners face when learning kanji, integrating calligraphy into JFL classroom can be suggested in order to facilitate the JFL learners’ written production of kanji characters.
Chapter 8 Kanji Practice Sheet

Appendix A

第八課：「結婚準備」
漢字練習箇所

1. 結婚式
2. 祭典
3. 神社
4. 神社
5. 神社
6. 祝賀
7. お祝い
8. 花嫁
9. 花嫁
10. 新婦
11. 新婦旅行
12. 両親
13. 接待
14. 運転

なまえ：

Chapter 8 Handout
### Appendix B

Chapter 9 Kanji Practice Sheet

<table>
<thead>
<tr>
<th>朝帰り</th>
<th>修学旅行</th>
</tr>
</thead>
<tbody>
<tr>
<td>見送る</td>
<td>帯姿</td>
</tr>
<tr>
<td>女生徒</td>
<td>夜踊る</td>
</tr>
<tr>
<td>考え 込む</td>
<td>文京区</td>
</tr>
<tr>
<td>眠る</td>
<td>娘教</td>
</tr>
<tr>
<td>育立名</td>
<td>私有</td>
</tr>
</tbody>
</table>
Appendix C

Kanji Test A (Chapter 8)

Write down the appropriate Kanji for following English equivalent.

1) marriage ceremony, wedding ________________

2) young ________________

3) Shinto shrine ________________

4) Shinto priest ________________

5) Equalize, formula, ceremony ________________

6) relative ________________

7) Congratulations, celebration ________________

8) bride ________________

9) groom ________________

10) newly-wed ________________

11) honeymoon ________________

12) parents, both parents ________________

13) (PST) invitation ________________

14) driving ________________
Appendix D

Kanji Test B (Chapter 9)

Write down the appropriate Kanji for the following English equivalent.

1) going home in the morning
2) school trip
3) to see off
4) uniform
5) appearance
6) High School Girl
7) student
8) staying up all night
9) to dance
10) to think seriously
11) bunkyo district (in Tokyo)
12) to sleep
13) daughter
14) education
15) privately founded
16) renowned famous
References


phonographic Kana in literacy acquisition: how important are visual and phonological skills? *New York Academy of Sciences. 1145*, 41-55.


