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This study investigated whether the learning outcomes of Chinese by first
year Japanese university students correlated with how Chinese was presented to them, either in
pinyin romanization only or as a combination of pinyin romanization and Chinese characters in
parallel. Students were divided into two learning groups, each using a different version of the same
 textbook. One version presented all vocabulary, dialogues and drills in pinyin romanization only
and the other version presented them as a combination of both pinyin romanization and Chinese
characters. All grammatical explanations were presented in English. It turned out that the presence
or absence of Chinese characters did not correlate with learning outcomes in any statistical way. We
then looked to see whether TOEIC listening and reading scores and/or student GPA might correlate
with first year Chinese final exam scores. It turned out that GPA is weakly to moderately correlated
 and that TOEIC weakly correlated at best.

The prevailing textbook model for teaching beginning Chinese to foreign learners, not only in China but also in most universities around the world including Japan, follows a chapter template in which new vocabulary items are first presented one at a time, together with each new item's corresponding Chinese character(s) and each character's Romanized pinyin pronunciation. This is then followed by illustrative sentences, longer written texts and various types of exercises, almost always presented exclusively in Chinese characters and almost always without any Romanization to assist with pronunciation.

Given that written Japanese shares a large number of common characters with written Chinese, one might assume that Japanese learners would benefit greatly from such a textbook design and from instruction that insists on learning the Chinese characters for every new word from the very beginning of learning. Despite this, certain core linguistic principles, as well as certain research findings about reading in general and about reading Chinese and Japanese in particular, do give us pause. First, as noted by Bloomfield (1933), "Writing is not language, but merely a way of recording language with visible marks." Just because the same visible marks are used to represent pronunciation in two different languages does not demonstrate that the two spoken languages themselves be in any way genetically, grammatically or lexically similar with one another. The written representation of spoken Chinese and the written representation of spoken Japanese do share a large number of shared visible marks (characters/kanji). However, although the ON ( ) pronunciations used in Japanese do historically derive from Chinese, for the most part these ON pronunciations are unrecognizable to contemporary native Chinese speakers.

It has been firmly established that reading in general involves a process of internal vocalization of the written marks by the reader (Perfetti and McCutchun 1982). Therefore, for the presence of Chinese characters to have maximum usefulness for Japanese learners of Chinese, i.e., where knowledge of spoken Chinese guides the processing of written texts, while at the same time those same written texts also reinforce knowledge of the spoken language, then it is crucial that the vocalization of these written recordings of spoken Chinese be carried out with Chinese pronunciation, not Japanese. Otherwise, in their minds these students are not actually hearing spoken Chinese. Instead, they are working to mentally decode these non-Japanese strings of kanji into a logical Japanese meaning following Japanese pronunciation and word order.

The importance of students first being able to say in Chinese what they are later taught to read (and write) is highlighted in a year-long study conducted by Packard (1990) comparing two groups of first-year, English-speaking university students of Chinese who were taught the four skills of speaking, listening, reading and writing. The total length of the teaching year was twenty-six weeks, each week consisting of eight classroom hours, for a total of two hundred and eight classroom contact hours. The control group, after an initial introduction to Chinese pronunciation and pinyin spelling, proceeded for the remainder of the year to learn new spoken vocabulary simultaneously with their corresponding written characters, which was immediately presented to them in written character-only texts and exercises. The experimental group, on the other hand, initially maintained a three-week lag between when they were first taught vocabulary and grammar orally and in pinyin written form, and when they

were later taught the Chinese characters for these items. During the three-week lag period those new vocabulary items were temporarily written in pinyin instead, until students were finally taught the written characters. Gradually this three-week lag was shortened, so that by the end of the year both groups had been taught the same number of characters. Over the course of the year students in each group were periodically assessed in each of the four skills through regular testing. At the end of the year, it was shown that students in the experimental group not only displayed statistically better pronunciation and fluency than students in the control group, but that their reading and writing skills were statistically as good as those of students in the control group.

We wished to test whether placing a higher priority on pinyin at the expense of delaying the introduction of Chinese characters until the start of second year Chinese might also be effective for Japanese learners of Chinese during their first year of language study, as measured by both active skills (e.g., answering open ended questions using pinyin only) and passive skills (e.g., student listening comprehension) on the year-end final exam. We also wanted to determine whether learning Chinese through pinyin only in the first year advantaged or disadvantaged students in comparison to learning the same material through the traditional format of Chinese characters plus pinyin romanization.

(1) First Year Chinese is a required course for all eighty freshman students in the Faculty of International Communication at Komatsu University. Each year, the first forty students by order of student family name were assigned to that year's **experimental group** and remaining forty students by order of student family name were assigned to that year's **control group**. Both groups used different versions of the same Chinese textbook. Each version provided written English grammatical explanations to accompany the Chinese vocabulary lists, dialogues and drills. Where the two versions of the same textbook differed was the way that the Chinese vocabulary lists, dialogues and drills were presented. The control group saw all Chinese presented both in Chinese characters and in pinyin romanization, while the experimental group saw it presented only in pinyin romanization.

Retrospectively, examining the English reading and listening proficiencies of each student, as measured by TOEIC, as well as each student's academic achievement in the non-foreign language courses they were enrolled in over the two semesters of their first year at Komatsu University, as measured by their GPA in those non-foreign language courses, we could confirm that the method used to assign students to the two different learning cohorts resulted in groups that were statistically similar in terms of their respective group English abilities and academic achievement profiles. This is shown in Table 1 below:

Table 1: Group Statistics

	Class	N	Mean	Std. Deviation	Std. Error Mean
TOEIC (Listening)	Exp.	75	285.6000	57.13876	6.59782
	Cont.	75	269.0667	57.62585	6.65406
TOEIC (Reading)	Exp.	75	223.4000	50.69224	5.85344
	Cont.	75	210.4000	55.71865	6.43384

GPA (-English/-Chinese)	Exp.	75	2.7173	.36308	.04193
	Cont.	75	2.8179	.47012	.05429

In other words, neither group started with an underlying statistical advantage over the other group in terms of English reading ability, English listening ability or overall academic achievement.

(2) The research questions explored in this study were:

• Did learning Chinese through written characters and pinyin romanization versus learning only through pinyin romanization correlate differently from one another in a statistically significant way with student performance on the year-end Chinese final exam?

• Did English language ability, as measured by TOEIC reading and listening scores, correlate in a statistically significant way with student performance on the year-end Chinese final exam?

• Did overall academic performance at Komatsu University, as measured by student GPA in all courses other than Chinese and English, correlate in a statistically significant way with student performance on the year-end Chinese final exam?

(3) Statistical analysis using various tests was carried out on students in the 2019-2020 cohort and on students in the 2020-2021 cohort. Then the data for both year's control groups were merged to form a single mega control group and the data for both year's experimental groups were merged to form a single mega experimental group, providing even more robust data to carry out the same statistical analysis.

(1) As for the question of whether learning Chinese through written characters and pinyin romanization versus learning only through pinyin romanization correlated differently from one another in a statistically significant way with student performance on the year-end Chinese final exam, it turns out that both groups performed almost exactly the same as one another on question 1 (Chinese dictation into pinyin romanization and translation into English), question 2 (written pinyin answers to written English questions about themselves) and question 4 (written English to pinyin translation). Because the format of question 3 was changed from year 1 and year 2, it has been eliminated from the analysis here. This is shown in Table 2 below:

Table 2: Group Statistics (Experimental Class vs. Control Class)

	Class	N	Mean	Std. Deviation	Std. Error Mean
Final 1	Exp.	75	79.6533	18.22957	2.10497
	Cont.	75	77.7000	20.66480	2.38617
Final 2	Exp.	75	71.6267	18.21347	2.10311
	Cont.	75	71.8800	18.83209	2.17454
Final 4	Exp.	75	80.5733	12.99706	1.50077
	Cont.	75	80.7200	13.87060	1.60164
Final Total	Exp.	75	80.3333	11.33849	1.30926
	Cont.	75	80.0900	12.21047	1.40994

It is very clear, then, that the presence or absence of Chinese characters together with the pinyin romanization did not statistically correlate with learning outcomes, be they passive listening comprehension, passive reading comprehension or active production of Chinese sentences.

(2) Given that no statistical difference between the control group and the experimental group could be detected, thus eliminating the presence or absence Chinese characters in the learning process as a statistically significant correlate of future learning success, we then combined the two learning groups into a single, more robust mega group to investigate whether English reading proficiency, English listening proficiency and/or academic performance in non-foreign language courses might statistically correlate with performance on the first year Chinese final exam. The results are shown in Table 3 below:

Table 3: Correlation tests for groups combined					
Spearman's rho (N=150)		Section 1 (dictation & translation)	Section 2 (daily life questions, E > C)	Section 4 (E > C translation)	Final Total Exam Score
TOEIC (listening)	correlation (r_s =)*	.310	.320	.108	.253
	p-value	P < .001	P < .001	P = .188	P = .002
TOEIC (reading)	correlation (r_s =)	.245	.381	.272	.339
	p-value	P = .002	P < .001	P = .001	P < .001
Non-Chinese GPA	correlation (r_s =)	.342	.516	.388	.455
	p value	P < .001	P < .001	P < .001	P < .001
* ● .00-.19 "very weak" ● .20-.39 "weak" ● .40-.59 "moderate" ● .60-.79 "strong" ● .80-1.0 "very strong"					

From this we see that the strongest variable correlations are found in the GPA, where it appears that the score received for the exam in total is weakly to moderately related to the GPA result. These correlations are largely significant for the TOEIC reading and listening results, albeit it that the TOEIC test results are weakly correlated with the exam results. In sum, it appears that the student's university GPA performance has stronger correlations than their TOEIC results – however all are significant and warrant a deeper investigation into causality.

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Robert Sanders		
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