工学専攻学生のL1とL2における読解力比較

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　本論は日本の大学で工学を専攻する日本人学生を対象とした読解力についての研究である。被験者となる学生は3つの大学に及び，学生の日本語と英語での読解力の差を検討した。日本語と英語の読解力において学力の混在したクラスの学生 (2大学) のほうが推薦入試によるクラス (1大学) より読解力が優れていた。本研究により日本語で読解力の劣る学生は英語での読解力が劣ることが窺がわれた。この点は今後の課題となった。

Comparing Technical Students' L1 and L2 Reading Levels

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Introduction

The purpose of this paper is to compare the reading ability of technical students from three Japanese institutions with different characteristics. One is a small, now-incorporated national university, (Toyohashi University of Technology), another is a major private university (Kansai University), and the third a private technical college (Osaka Institute of Technology). What makes the study unique is that it compares both native and foreign language reading skills at different institutions. It follows similar studies comparing EFL proficiency between high school and junior college students (Truscott and Redfield, 1999), between elite private university students (Redfield and Wynne, 1999), public and private technical university students (Levin, 2004), *semmongakko* and college students (Larson and Redfield, 1999) and coeducational and women's college students (Wynne, C. and M. Redfield, 2000). The paper also includes results from a survey of the reading habits these technology students report. It should be of interest not only to faculties of the participating institutions, but also to those interested in language transfer from Japanese to English.

Method

Participants

272 college undergraduates took part in the study, 124 learners from the Kansai University (KU) Faculty of Technology, 104 from Osaka Institute of Technology (OIT), and 44 from Toyohashi University of Technology (TUT). All the learners were taking required English at the time of the study. Students from both KU and OIT included normally matriculated students of mixed English language ability from different school years: freshmen, sophomores and juniors. Because of scheduling conflicts, students from TUT only included the lowest English ability learners in their first year. All of these TUT students had been matriculated as *suisen* students; they all had graduated from technical high schools.

Instruments

EFL reading. Two measures were used to assess the learners' English reading ability: an SRA reading level test and part II (reading and vocabulary) of the Matsushita Pilot Placement test (MAT). Both of these tests are timed reading measures. The SRA focuses on reading comprehension, while the MAT adds a vocabulary and context element to reading comprehension. The two reading measure scores were combined to come up with the EFL reading score used in this study.

JSL reading. This measure consisted of four reading passages taken from a Japanese proficiency test preparation publication (the *Nihongo Noryoku Shiken Dokkai Mondai Taisaku; 1-Kyu*)—a test intended for non-native speakers of Japanese; hence, JSL. Each passage is followed by comprehension questions, with a total of twenty-seven items in all. Participants were given 20 minutes to finish each section of the test.

Japanese reading habits survey. A six-item survey was developed by one of the researchers to investigate a hypothesized correlation between Japanese L1 reading skills and EFL reading proficiency. Five of the items from that survey have been isolated for the purposes of the present paper. The reliability of these five items (standardized alpha) is .7742, more than

acceptable for a survey of this size. The survey items themselves can be found in the results section and again in the appendix.

Administration

All three measures (EFL reading, JSL reading, and the reading habits survey) were given by the researchers in their respective classes during the 2004/5 Japanese academic year.

Statistical analysis

A one-way ANOVA was used to compare EFL and JSL reading scores. Log-likelihood was used to analyze the survey. The JMP statistical package for the Macintosh computer was used in the analysis. The alpha for statistical significance was set at the customary .05 level. Rsq figures are also reported.

Research questions

1. Would there be statistically significant differences between the participants' English reading scores?

2. Would there be statistically significant differences between the participants' Japanese reading scores?

3. Would there be differences in the reading habits of the technology students among institutions?
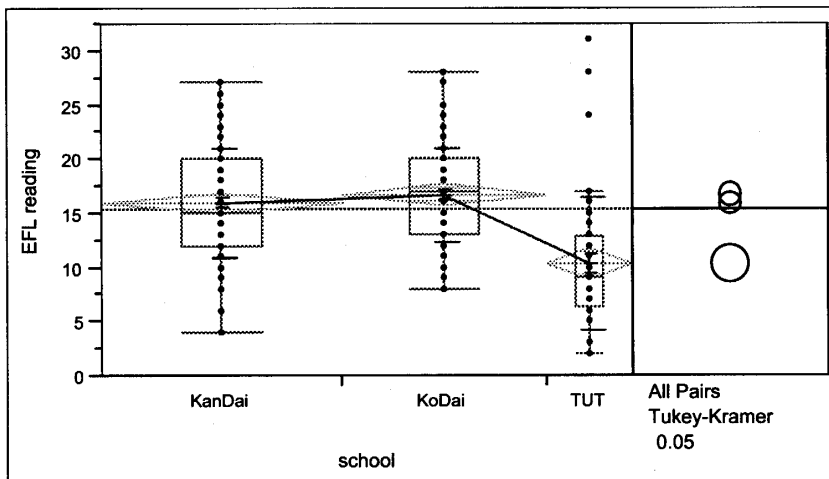
Results

EFL Measure

The OIT learners averaged 16.6635 on the EFL reading measure, (sd = 4.36137, N = 104). The KU group scored slightly lower on the measure (X = 15.9106, sd = 5.02291, N = 123). The scores for the TUT students were X = 10.2500, N = 44, sd = 6.0966. (See Table 1 for descriptive statistics).

Table 1
EFL reading descriptive statistics

Level	Number	Mean	Std Dev	Std Err Mean	Lower 95%	Upper 95%
KU	123	15.9106	5.02291	0.45290	15.014	16.807
OIT	104	16.6635	4.36137	0.42767	15.815	17.512
TUT	44	10.2500	6.09661	0.91910	8.396	12.104

A one-way ANOVA was performed to analyze the means scores. This resulted in an F-ratio of 27.4887, which was significant at the p = 0.001 level. The post-hoc Tukey-Kramer indicated that the difference between the OIT and TUT learners as well as the difference between the KU and TUT learners was statistically significant. There was no significant difference between the OIT and KU groups. The Rsq was .17022 (see Figure 1).

Figure 1. Graphical display of EFL ANOVA results.
(KanDai=KU KoDai=OIT)

JSL Measure

The KU group scored the highest on the JSL reading measure (X = 21.1870, sd = 3.88851, N = 123). The OIT and TUT groups scored 17.7885 (sd = 3.98461, N = 104) and 17.5227 (N = 44, sd = 4.69284), respectively (see Table 2 for descriptive statistics).

Table 2

JSL descriptive statistics

Level	Number	Mean	Std Dev	Std Err Mean	Lower 95%	Upper 95%
KU	123	21.1870	3.88851	0.35061	20.493	21.881
OIT	104	17.7885	3.98461	0.39072	17.014	18.563
TUT	44	17.5227	4.69284	0.70747	16.096	18.949

Again, a one-way ANOVA was selected as the appropriate measure to further analyze the data. The results yielded an F-ratio of 24.6546, significant at the p = 0.0001 level. The KU group was at a significantly higher JSL reading level than either of the corresponding OIT and TUT groups on this

measure. The Rsq was .155389 (see Figure 2).
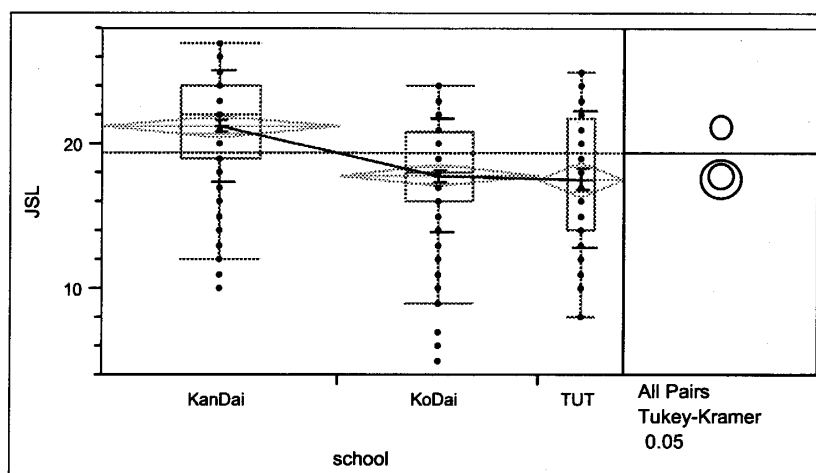
Figure 2. Graphical display of JSL ANOVA results.
(KanDai=KU KoDai=OIT)

Discussion of EFL and JSL results

Not surprisingly, the KU and OIT groups, which had students of varying English ability and year level, had means on the English reading measure that were somewhat higher (statistically significant) than the group from TUT. However, it was a bit surprising to see the mean scores for OIT statistically even with KU (a higher ranked institution). This could have been due to a larger ratio of higher English level students in the OIT group, a larger ratio of students in higher years of school, or both. It is difficult to assess the exact reasons without streaming for English proficiency— something to consider for the future studies. However, the results here, between KU and TUT, seem to back up the results in a previous comparative study between the same groups (Levin, 2004): the lower English level TUT students were below the level of non-streamed KU learners in that study as well. Fortunately, we know that these TUT lower level English learners do improve their English skills once in university (Levin, 2005).

With the JSL reading measure, we see results that could be predicted considering the dynamics of the groups. However, it was encouraging to see that the exclusively lower level learners from TUT were statistically the same as OIT and only a little lower than the KU students when it came to Japanese reading proficiency measure. This might indicate that the quality of Japanese language instruction in the technical high schools is not much different than

that at regular high schools—a point that could be investigated in future research.

Japanese reading habits Survey Results

On four of the five survey items, we found statistically significant differences between the university groups surveyed. The results for each item are presented below.

Table 3

Item 1: Please rate your Japanese reading skills.

	1	2	3	4
KU	24 19.35	71 57.26	26 20.97	3 2.42
OIT	21 21.88	38 39.58	30 31.25	7 7.29
TUT	18 40.91	21 47.73	3 6.82	2 4.55
total	63	130	59	12

1 = poor   2 = average   3 = good   4 = very good   Prob > ChiSq = 0.0014

The vast majority of TUT learners rated their Japanese reading skills as either *poor* (41%) or *average* (48%). Showing a bit more balance, only 19% of the KU students rated themselves *poor* in reading, but 21% as *good* in reading. 22% of the OIT group said they were *poor* in reading, but 31% rated themselves as *good* (see Table 3).

Table 4

Item 2: What kind of grades did you get in Kokugo?

	1	2	3	4
KU	34 27.64	58 47.15	22 17.89	9 7.32
OIT	32 33.33	35 36.46	22 22.92	7 7.29
TUT	19 43.18	18 40.91	5 11.36	2 4.55
total	85	111	49	18

1 = poor   2 = average   3 = good   4 = very good   Prob > ChiSq = 0.3522

There was no significant difference between the groups regarding their reported high school *kokugo* grades. Although, a smaller percentage of the TUT learners rated themselves as either *good* (11%) or *very good* (6%) (see Table 4).

Table 5

Item 3: How many books do you read in Japanese for pleasure in a year?

	0	1	2	5	10	20
KU	21 16.94	11 8.87	35 28.23	27 21.77	14 11.29	16 12.90
OIT	9 12.00	15 20.00	16 21.33	15 20.00	17 22.67	3 4.00
TUT	6 13.64	10 22.73	7 15.91	13 29.55	6 13.64	2 4.55
total	36	36	58	55	37	21

Prob>ChiSq=0.0277

The differences on this item met our .05 alpha for statistical significance. The TUT learners reported reading either no books at all or only one book a year (a combined 36%), a higher figure than the OIT (32%) and KU groups (26%). At the top of the scale, 13% of the KU students reported reading 20 or more books a year, as opposed to only 4% of the OIT group and 4.5% of the TUT learners (see Table 5).

Table 6

Item 4: How many minutes do you read non-school Japanese material a day?

	0	15	30	60
KU	30 24.19	35 28.23	38 30.65	21 16.94
OIT	19 21.35	38 42.70	23 25.84	9 10.11
TUT	19 43.18	6 13.64	9 20.45	10 22.73
total	68	79	70	40

Prob>ChiSq=0.0040

This item was also significant. 43% of the TUT learners reported not reading at all on a daily basis, as did 25% of the KU and 21% of the OIT group. More TUT learners, however, reported reading at least an hour a day

(23%) than their peers (KU 17%, OIT 10%) (see Table 6).

Table 7

Item 5: Do you like to read Japanese?

	1	2	3	4
KU	18 14.52	39 31.45	50 40.32	17 13.71
OIT	9 9.38	34 35.42	42 43.75	11 11.46
TUT	6 13.64	25 56.82	7 15.91	6 13.64
total	33	98	99	34

1 = no   2 = a little   3 = somewhat   4 = a lot   Prob > ChiSq = 0.0215

When asked if they enjoyed reading, 69% of the TUT students said *no* or only *a little*. The figures for KU and OIT were 46% and 45%, respectively. On the other hand, 14% of the TUT and KU groups said they like reading *a lot*, along with 11% of the OIT learners (see table 7).

Discussion of the survey results

The survey results re-enforce what we saw on the EFL and JSL reading measures. The TUT group was significantly lower in EFL reading, and also lowest on the JSL, although the difference between the TUT and OIT groups was not significantly different on this measure. According to the survey, as a group the TUT learners read less than the others groups, do not enjoy it as much, and rank their reading ability lower than the KU and OIT groups. Since reading was important in both the EFL and JSL measures, it is not surprising that the groups that read more do better. As noted above, the TUT group was screened for English ability (the others were not) and only the lowest TUT group (in English ability) took part in this study. Higher TUT sections presumably would have done better. What is more interesting is the fact that this lowest TUT group also does not seem to read their native language very much. Could it be that reading in Japanese is also a key factor in reading in English? It would seem so, but of course further research is needed in this area.

Conclusion

272 undergraduate technology majors from three Japanese universities were administered reading measures in their native and first foreign languages. The Osaka Institute of Technology and Kansai University students were better at reading English than the students at Toyohashi University of Technology, while the Kansai University technology majors proved more able at reading Japanese than learners from the other two institutions. One explanation for these results seems to be quite apparent: the TUT group was streamed for English ability, and only the lowest ranked learners were studied in the present research. In addition, there did seem to be evidence that poorer reading skills in Japanese could also predict poorer reading skills in English; however, more research into this area would need to be conducted to confirm this assumption.

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Appendix

Japanese Reading Skills Questionnaire

1. Please rate your Japanese reading skills.
poor   average   good   very good

2. What kind of grades did you get in Kokugo?
poor   average   good   very good

3. How many books do you read in Japanese for pleasure in a year?
(0)   (1)   (2)   (5)   (10)   (20+)

4. How many minutes do you read non school Japanese a day?
(0)   (15)   (30)   (60)   (60+)

5. Do you like to read Japanese?
no   a little   somewhat   a lot