Measuring the Effects of Reading Fluency Practice and Extensive Reading on L2 Reading Fluency

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Reference Data:

This paper reports on a semester-long study of student reading speeds, levels of comprehension, and their relationship to extensive reading (ER) in English. First, the pedagogical rationale for the course is described, which is based on Nation's (2007) four strands of activities that make up a balanced language course. The subjects, 3 groups of 1st-year university students at 2 institutions in Japan, practiced reading fluency activities with a textbook. They also studied high-frequency vocabulary and participated in a 15-week extensive reading program. Analyses by ANOVA showed that the subjects were able to increase their reading speeds for short passages without sacrificing reading comprehension. In addition, there was a strong correlation found between the amount read and reading speed.

　本稿は、一学期に渡って学生の英語での読解速度や読解レベルと多読学習との関係についての研究の報告である。始めに授業の教育・理論的根拠を提示する。それはNation（2007年）のバランスのとれた外国語授業の活動の四分類（Four Strands）に基づいている。対象者はいずれも日本の二つの大学一年生であり、三クラスの学習者は、テキストを用いて速読訓練を受けた。と同時に、頻度が最も高い語彙を学習しながら、15週間の多読プログラムに参加した。分散分析（ANOVA）の観測結果により、学習者は、読解力を損なうことなく比較的に短い英文の読む速度を上げることができた。また、多読学習においては、読書量と読解速度の間に強い相関が見られた。

THIS PAPER reports on a semester-long project to increase the L2 reading rates of Japanese university students at two universities. Students were tested on their reading speed each week and results are compared from the 1st, 7th, and 15th weeks. In addition to practice on reading speed, students had focused vocabulary study with weekly quizzes. Students also completed an extensive reading (ER) program by reading graded readers both in and out of class. In this paper I will describe the rationale and context of the project, the procedures, and the results, which show a strong correlation between reading speed and ER, increased fluency, and stable levels of comprehension.

Rationale

In the EFL context of Japan, it is especially difficult for learners of English to use English in meaningful ways. Some communicative elements have been introduced into the junior and senior high language curricula such as listening classes. Assistant Language Teachers (ALTs), who are native speakers of English, are placed at most schools to increase opportunities for communication. However, university-bound students are often trained through more traditional approaches such

as grammar-translation, in which they do drills on discrete grammar points or translate passages from English to Japanese (Ikeda, 2005; Narita, 2013, 2014; Soda & Kazawa, 1994). Japanese instructors rarely use the target language for any meaningful interaction with the students and learners are deprived of opportunities to produce language in any meaningful way (Daikatsu, 2005; Tanaka & Stapleton, 2007). Regarding students' reading habits in their L1, a recent study by the Japanese Agency for Cultural Affairs (2014) made headlines when it found that 57% of 16- to 19-year-olds either read "very little" (32%) or "not at all" (25%). If young Japanese are not reading in their L1, it is not difficult to imagine that few, if any, students read books in English beyond their textbooks.

Nation's Four Strands

In his work on L2 acquisition, Paul Nation (2007) laid out the four elements that should be included in a successful program of language learning. Nation calls these elements *strands* as they should be threads that run through the curriculum.

The first strand is that of *meaning-focused input*. Referring to Krashen's (1985) theory of comprehensible input, Nation argued that it is critical for learners of an L2 to be exposed to massive amounts of the language, used in a meaningful way. ER of graded readers is considered effective to increase learners' input and develop a larger sight vocabulary (Day & Bamford, 1998). Second is the strand of *meaning-focused output*—the learner must have opportunities to produce language in a meaningful way. In other words, it is not enough for learners to simply be exposed to the language, they must also be able to put their knowledge to use and to produce language. To facilitate these processes, learners must also focus their attention to the language itself through the study of its grammar and vocabulary. This is the third strand—*language-focused learning*. Finally, the learner must be afforded the opportunity to use the language over and over again until it becomes automatic. In doing so, the learner builds both receptive and productive fluency, which

are the hallmarks of a proficient language user. For the language classroom to be effective, Nation held, these four strands must run through and be well balanced in any program of study. The four strands of Nation inform the approach of the present study.

Previous Work on L2 Reading Fluency

The body of studies on ER has been growing rapidly as the practice has become more widespread. The benefits of ER on reading comprehension, vocabulary, writing performance, and grammatical competence have been well documented in both EFL and ESL contexts. Krashen (2004), Iwahori (2008), and Grabe (2010) have surveyed previous studies into the effectiveness of ER on various skills. Summaries of empirical ER studies can be found in Robb and Kano (2013) and Beglar and Hunt (2014).

Research in L1 and L2 reading fluency are usually measured by reading rates, or words per minute (wpm). L1 readers usually read at around 250-300 wpm (Chang, 2010; Grabe, 2009, p. 310). L2 readers read at much slower rates, usually half or less than L1 readers (Cushing-Weigle & Jensen, 1996; Nation, 2005; Taguchi, Takayasu-Maass, & Gorsuch, 2004).

Regarding the effects of speed on comprehension, Cushing-Weigle and Jensen (1996) investigated the effects of various fluency activities and strategies on reading rates in an ESL context. They found that although the subjects improved their reading speeds, the gains came at the expense of comprehension. The authors claimed that this may have been due to the more academic nature of the pretest and posttest passages when compared to the passages of the treatment. Nation (2005) argued that in careful silent reading, readers should score from 70-80% on comprehension questions without referring to the passage. If they score higher, then they are probably reading too slowly. Conversely, scores lower than 70% probably indicate that the text is too difficult for the reader and may be more suitable to more "expeditious" reading activities such as skimming or scanning.

Chang (2010, 2012) conducted several experimental studies into the effectiveness of practiced timed readings and reading rate gains. Chang's (2010) study was with 84 university students in an EFL context. The participants were divided into two groups; the experimental group did weekly timed readings but the control group did not. The experimental group members increased their reading speeds by 25% and also slightly increased their comprehension. The results were not significant for the control group. In 2012, Chang published another study on the effects of timed readings and repeated readings. Thirty-five adults in an EFL context were divided into two groups of timed reading (TR; $n = 18$) and repeated reading (RR: $n = 17$). Although both groups increased their reading speeds, the TR group significantly outperformed the RR group in wpm and comprehension. The second finding was that the TR group had higher levels of comprehension and retained these in a delayed posttest. There was no ER component in either of these studies.

Regarding the effect of ER on reading rates, Beglar, Hunt, and Kite (2012) measured the effects of pleasure reading versus intensive reading on 97 Japanese university students over 1 year. They found that all groups who did ER (pleasure reading) outperformed the intensive readers and those within the pleasure reading group who read less were outperformed by their peers who read more. In a more recent study, Beglar and Hunt (2014) found that subjects who read more than 200,000 words in an academic year had higher reading speeds. However, that study did not combine ER with the regular timed fluency practice. In the present study, the combination of ER and timed fluency practice was investigated to answer the following research questions:

1. Is there a correlation between the amount students read extensively and their reading rates?
2. How much will the reading fluency of students increase during a 15-week semester?
3. As students read faster, will their comprehension be adversely affected by the speed?

Method
Subjects

This study included three independent groups of students at two universities in Japan ($N = 84$). All students were 1st-year university students and the courses were required, general education English. All classes met for 90 minutes per week for 15 weeks. The students took no other compulsory English courses. One group was at a national 4-year university and the other two were at a private university.

The students at the national university majored in medicine ($n = 25$) and had undergone rigorous education to prepare them for highly competitive entrance examinations. Two-thirds of these students were male. They were placed in the highest class based on the results of a placement test made by a private company. Because these test scores were not provided to the instructors, there was no way to know individual students' proficiency levels. However, it is well known that students at medical departments throughout Japan typically are, academically, some of the country's best and brightest.

The second and third groups were at a private university, one group majoring in nursing ($n = 28$) and the other in pharmaceutical science ($n = 31$). The nurses were overwhelmingly female, with only three males in the class. The pharmacy class was the most gender-balanced, roughly half and half. These nursing and pharmacy students were also streamed by a different placement test developed by a private company and were the highest level within their respective cohorts (200 students; 100 in each major).

As was the case with the medical students, instructors were not shown the results of the placement tests. So, in order to compare relative academic abilities of the three groups, I consulted a *hensachi* ranking (*Hensachi kara sagaseru*, n.d.) According to Newfields (2006), the *hensachi* is a "standardized rank score" (p. 27) of universities that is commonly used throughout Japan. The medicine, nursing, and pharmacy department scores were 69, 49, and 48, respectively.

Based on these figures, it was assumed that the medical students were at a higher academic level and the nursing and pharmacy students of average academic ability.

Determining Difficulty of Test Passages

It is important to use test passages that are relatively equal in their levels of difficulty. Therefore, the passages were assessed through an online program (https://readability-score.com). Results are shown in Table 1. The Flesch-Kincaid Readability score is a measurement on a scale of 0-100; a higher score means that a text is more readable. The Flesch-Kincaid grade level shows the L1 grade level of the text. The three texts taken from *Reading for Speed & Fluency Book 1* (Nation & Malarcher, 2007) were at the primary school fourth-grade level. The test passages taken from *Book 4* showed more variation, from high fifth grade to seventh grade levels.

Table 1. Flesch-Kincaid Readability Scores and Grade Levels for Test Passages

Book No.	WPM tests	Title of passage	Flesch-Kincaid readability score	Flesch-Kincaid grade level
1	Week 1	*Groups of Animals*	84.6	4.3
	Week 7	*Book Clubs*	90.9	4.4
	Week 15	*Learning and Unlearning Fear*	82.7	4.5
4	Week 1	*The Art of Photography*	65.1	7.6
	Week 7	*Credit Cards*	74.2	6.9
	Week 15	*Ritalin*	78.3	5.8

Note. All texts from *Reading for Speed & Fluency Book 1* by Nation & Malarcher, 2007.

Classroom Procedure

There were three main components of the course: timed fluency reading, vocabulary study, and ER. A typical class began with a vocabulary quiz and ended with a timed fluency reading. The rest of the time was spent on a variety of activities to practice using the language, including reading circles, book spot presentations, instant book reports, and 4-3-2 fluency activities to reinforce the ER program.

Each week, students practiced reading fluency with a textbook from the series *Reading for Speed & Fluency* (Nation & Malarcher, 2007a,b). The textbook contains 40 nonfiction passages on eight themes. Although the classroom procedure was the same for all three groups, the medical students practiced reading fluency with *Book 4*, a higher level of the textbook, and the nursing and pharmacy students used *Book 1*. In *Book 1*, the passages are approximately 300 words each and are written using only high-frequency vocabulary at the 500-word level, as described in Chang & Millet (2013, p. 133). Each passage is followed by five multiple-choice questions that must be answered without referring back to the main passage. The passages in *Book 4* are slightly longer, approximately 400 words, and are written using the vocabulary from the first 2,000 words. There are eight comprehension questions after each passage.

In addition to the timed fluency readings, students did language-focused training through vocabulary study. Students were tasked with making 20 vocabulary cards each week. They were allowed to choose unknown words from the textbook, graded readers, or from an adapted list of the most frequent 1,000 English words taken from the *General Service List* (Mikulecky & Jeffries, 2009, pp. 293-295). The following week, students quizzed each other in pairs using a standardized form of 10 questions with three question types:

> (type a) How do you say [Japanese word] in English? (four questions);
>
> (type b) How do you say [English word] in Japanese? (four questions); and

(type c) Use [English word] in a sentence, phrase, or collocation (two questions).

The questions were on a set of cards. Students selected cards randomly and asked the question on the card. Students were tested at monthly intervals on all the words they had previously studied by randomly generating the numbers of some of their vocabulary cards.

Finally, all students read extensively. None of the participants in this study reported having had experience in ER prior to entering the university. Students were expected to read a minimum of 5,000 words per week to obtain a minimum passing grade. Their progress was tracked using the *Moodle Reader* quiz module (http://moodlereader.org/) that had been installed on the university servers. After reading a book, students took an online quiz of 10 questions consisting of four question types: true/false, multiple-choice, "who said," and ordering of events. The quiz questions are randomly generated by the quiz module from a bank of 20-30 questions. The purpose of the quizzes was not to test comprehension per se, but to determine if the student actually read the book. Therefore, questions on literary interpretations or inference were avoided. When a student passed the quiz with a score of 60% or better, the student was considered to have successfully read the book. The book's word count was then added to a running tally of words read in the student's account. When taking the quizzes, students sometimes failed a quiz or two until they became familiar with the quiz format and found their appropriate reading level.

The students were encouraged to read as much as possible. They were instructed that the more they read, the higher their ER grade would be, as shown in Table 2. Time was sometimes allotted for in-class ER, but generally it was completed out of class.

Table 2. ER Program—Word Targets and Grades

Words per week	Target for 15 weeks	Grade	Points
10,000	150,000	A++	45
9,000	135,000	A+	40
8,000	120,000	A	36
7,000	105,000	B	32
6,000	90,000	C	28
5,000	75,000	D	24
4,000	60,000	D-	20

Study Procedure

Students first did the exercises to learn the vocabulary at the beginning of each set of test passages. An electronic tablet displaying a large stopwatch was placed so all students could see it and accurately record their finishing times. Students were told to begin reading silently at the command "Go!" At the command, the stopwatch was started. After reading the passage and recording their times, students answered comprehension questions without referring to the passage. They then recorded the times and comprehension scores on a chart.

The comprehension questions were multiple choice and typically had three answer choices. There was one question about the gist or main idea of the passage and two to four questions about global understanding of the passage. Alternatively, one question was about vocabulary that appeared in the passage whose meaning was clear if the student had understood the reading.

Results of the Study

Extensive Reading and Reading Rates

In the first research question I looked into a possible correlation between the amount students read extensively and their reading rates at the end. To answer this question, data were collected from *Moodle Reader* and in-class reading rates of textbook passages. Table 3 shows the averaged results per student from *Moodle Reader* for each group.

Table 3. Average Results From *Moodle Reader* (*N* = 84)

Group	Quizzes taken	Passed	Failed	Passing %	Words read
Medicine (*n* = 25)	18.8	15.3	3.5	81	185,307
Nursing (*n* = 28)	43.2	38.7	4.5	89	112,229
Pharmacy (*n* = 31)	36.4	32.2	4.2	88	125,046

Note. Quizzes = number of quizzes taken (i.e., the number of books that the students claimed to have read); Passed = the number of quizzes that were passed with a score of 60% or better; Words = the total number of words that were read.

For most students, this was their first experience to read an English book from cover to cover. The nursing and pharmacy students, in particular, were instructed to begin with easier, lower level books. Once they had built up reading stamina and developed confidence, they were encouraged to read more challenging books. This partly explains why they read more books than the medical students. The medical students typically began with higher level books, such as *Oxford Bookworms* Stage 4 (1,400 headwords). Although they read fewer books on average (and therefore took fewer quizzes), each book had a much higher word count.

The reading rates in week 15 and the number of words read were analyzed to see if there was a relationship between the two. Table 4 shows the means and standard deviations for the in-class reading rate at weeks 1, 7, and 15 and the results of the ER program for all participants.

Table 4. Average Reading Rates and Total Words Read (*N* = 84)

	Words per minute						Total words read	
	Week 1		Week 7		Week 15			
M	*SD*	*M*	*SD*	*M*	*SD*		*M*	*SD*
118	24	160	41	198	48		140,438	54,169

A Pearson correlation was conducted for each individual student to determine if there was significant correlation between the reading rates in week 15 and the total words read in the ER program (see data for individual students in the Appendix). The results showed that they were strongly correlated, r (82) = .39, $p < .01$. The students who had higher totals of words read in the ER program were the faster readers.

Fluency

In the second research question, I asked how much the reading fluency of students would increase during a 15-week semester. To answer this question, students' reading rates at three points in time were collected and averaged. The words per minute for each group was averaged and the results are shown in Table 5.

A one-way ANOVA was conducted on the results for reading rates at the three points in time. The results showed statistically signifi-

cant differences between the means for each student's words read per minute in week 1, week 7, and week 15 [F (2, 249) = 89.7, p < .0001]. In addition, Tukey HSD Post Hoc Test results revealed statistically significant difference (at p < .01) between week 1 and week 7 as well as between week 7 and week 15 (WPM 1, 2, and 3, respectively). Thus, by the end of the semester, students were able to read the textbook passages significantly more quickly than in week 1.

Table 5. Average Reading Rates and Total Words Read by Department

Department	Words per minute			Words read
	Week 1	Week 7	Week 15	
Medicine (n = 25)	110	175	214	190,390
Nursing (n = 28)	126	154	191	112,175
Pharmacy (n = 31)	118	154	193	125,681

A comparison of the results from the first and final tests shows that medical students increased their speed dramatically, by 92%, but this could partly be attributable to a decreasing level of difficulty in the test passages (see Table 1). Nursing students increased their speed by 52% and pharmacy students increased their speed by 63%.

Reading Comprehension

In research question 3, I wondered if students' reading comprehension would be adversely affected by the speed at which they read. To answer this question, I compared the mean scores of the reading comprehension tests in weeks 1, 7, and 15. These are shown in table 6. It appears the students' level of understanding was highest in week 1. In week 7, it dipped and then in week 15, it went up again.

Table 6. Mean and Standard Deviation of Reading Comprehension Scores

Students	Week 1 test		Week 7 test		Week 15 test	
	M	SD	M	SD	M	SD
Nursing & Pharmacy (n = 58; 5 questions)	4.53	.62	4.06	.79	4.25	.60
Medicine (n = 25; 8 questions)	7.23	.76	6.57	1.02	7.07	.97

Two one-way ANOVA analyses were conducted to compare the results of comprehension scores in weeks 1, 7, and 15. Nursing and Pharmacy students [F (2, 55) = 8.43, p < .001] were reading faster and comprehending at above 70%. According to the Tukey HSD Post Hoc Test, the difference between the means of the tests for weeks 1 and 7 was significant at p < .01. However, the difference between the means of weeks 1 and 15 was not significant at p < .05, nor was the difference between the means of weeks 7 and 15. Likewise, comprehension scores of the Medicine students in weeks 1, 7, and 15 did not appear to show the adverse effects of speed [F (2, 23) = 3.52, p = 0.034581]. The Tukey HSD Post Hoc Test performed on the scores of the medical students showed that the difference between the means of the week 1 and 7 tests was significant at p < .05, but that the differences between the other two (weeks 1 and 15, and weeks 7 and 15) were not significant. Perhaps the format of five and eight comprehension questions may be insufficient to detect real gains in comprehension (see Gorsuch & Taguchi, 2008; Taguchi & Gorsuch, 2002; Taguchi et al., 2004). However, this issue lies beyond the scope of this paper and must be investigated in future studies.

This "V" shape of the data shows students' initial tendency to read slowly for maximum comprehension, just as they were trained in high school. After several weeks of timed practice, however, as

their speed increased dramatically, their comprehension scores fell slightly, but the scores rose again at the end of the semester.

Discussion and Conclusion

As shown in Tables 4 and 5, the students' reading rates in the pretest were slow, which is typical of L2 readers in Japan. As expected, their week 1 comprehension was higher than in subsequent readings, which is consistent with findings of previous studies. Japanese 1st-year university students have been trained to read as accurately as possible for comprehension and have had little or no fluency training. However, by week 7, students were reading appreciably faster, and although their comprehension decreased slightly, the mean comprehension score remained above 80%, which easily surpassed Nation's (2007) recommended minimum level of understanding of 70%. The final reading test showed a marked increase in words per minute with higher comprehension rates. At this stage, students were showing clear progress in terms of their reading fluency without compromising their understanding of the passages.

Limitations

One issue is the length of the passages. If students read a longer passage, such as a narrative, their reading speed drops dramatically to about 100 wpm (Nishizawa, Yoshioka, & Fukada, 2010). A more accurate approach to measuring reading speed, Nishizawa et al. posited, would be to have students read a passage of approximately 3,000 words. This could be done by dividing a graded reader such as an *Oxford Bookworms Stage 1* book (with 400 headwords) into halves of approximately 2,500 words each. Students could read the first half as their pretest and then read the second half as the posttest. However, this approach is time consuming and not practical in a university context in which teachers only meet students for 15 lessons per semester. Here, the issue seems to slightly shift to a larger question: reading speed of what and for what purpose? Is it a measurement of reading only short, expository writing, as in this study, or is it for extended narratives? Different genres, lengths of text, and purposes for reading could affect the results.

Finally, the most serious flaw of the study is a lack of a control group. In the university context, it is exceedingly difficult to design a study with both experimental and control groups that share equal times on task to empirically measure the effects of treatment. Beglar et al. (2012) and Robb and Kano (2013) are examples of the few studies that met this standard. Although the current study lacked a control group, the tendencies found corroborate findings from those studies.

Conclusion

It does appear that students were able to read faster in the posttest while maintaining relatively high levels of comprehension. This is counter to what has been claimed in some of the literature (e.g., Chang, 2010; Cushing-Weigle & Jensen, 1996) but similar to results from Chang (2012). In terms of their reading rates, students generally showed steady progress over 15 weeks. All students increased their speed (medicine students by 92%, pharmacy students by 63%, and nursing students by 52%) while still achieving at least 80% reading comprehension.

In conclusion, the results seem to suggest that the weekly practice of timed readings, in conjunction with focused vocabulary training and a large amount of meaning-focused input through ER, did indeed help students to become more fluent in reading short passages of 300-400 words. Furthermore, comprehension was not sacrificed. In addition, there was a strong correlation found between the amount of extended reading done and a student's reading speed. For future studies, however, other factors must be addressed, including the length and genre of the passages and the reliability of the comprehension questions. These factors must be investigated to make the claims of improvement more robust.

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Appendix

Table A1. Individual Results for Reading Rates and Words Read (N = 84)

ID Number	Dept.	WPM1	WPM2	WPM3	Words Read
1	M	116	200	300	256,258
2	M	133	257	300	250,894
3	M	100	225	300	238,910
4	M	129	171	180	231,199
5	M	116	180	164	230,226
6	M	100	189	212	228,072
7	M	100	144	300	225,568
8	M	100	150	180	211,745
9	M	100	124	171	209,190
10	M	100	116	157	204,945
11	M	100	171	150	199,876
12	M	113	171	225	195,434
13	M	100	225	257	185,165
14	M	129	240	257	184,704
15	M	120	300	300	183,156
16	M	100	144	150	182,528
17	M	100	129	180	179,112
18	M	120	200	225	173,765
19	M	100	100	257	173,398
20	M	129	189	240	165,592
21	M	109	138	212	155,297
22	M	100	150	150	150,821
23	M	120	189	200	141,907
24	M	109	150	138	114,465
25	M	100	124	138	87,535
26	N	200	164	171	176,688

ID Number	Dept.	WPM1	WPM2	WPM3	Words Read	ID Number	Dept.	WPM1	WPM2	WPM3	Words Read
27	N	180	180	212	164,325	57	P	100	113	124	157,464
28	N	124	157	225	161,431	58	P	100	150	189	155,793
29	N	138	144	157	160,158	59	P	200	257	257	155,132
30	N	113	157	200	156,147	60	P	100	100	113	154,224
31	N	138	171	225	155,278	61	P	129	212	212	152,961
32	N	103	180	240	154,382	62	P	109	144	189	152,784
33	N	157	189	277	153,040	63	P	100	120	189	152,046
34	N	129	150	212	150,628	64	P	100	144	171	151,929
35	N	103	113	180	150,267	65	P	100	106	138	151,892
36	N	133	150	212	138,095	66	P	144	138	257	151,849
37	N	100	180	212	135,592	67	P	129	180	257	150,364
38	N	129	180	212	127,250	68	P	124	164	164	150,252
39	N	129	157	189	123,427	69	P	100	103	225	150,182
40	N	106	100	133	107,486	70	P	100	100	157	139,903
41	N	100	100	113	102,863	71	P	144	171	200	124,559
42	N	138	200	200	102,283	72	P	120	144	240	121,160
43	N	100	150	189	102,116	73	P	100	144	189	114,595
44	N	120	100	109	99,919	74	P	103	164	189	110,503
45	N	100	150	225	90,407	75	P	124	180	277	110,086
46	N	180	212	212	86,523	76	P	100	133	116	109,901
47	N	100	150	171	77,815	77	P	100	109	144	105,952
48	N	116	150	180	77,580	78	P	138	225	240	94,620
49	N	100	144	157	54,304	79	P	124	150	180	92,472
50	N	138	150	200	50,773	80	P	100	164	212	90,018
51	N	113	133	171	36,053	81	P	133	157	212	75,835
52	N	113	180	180	32,898	82	P	103	133	180	51,985
53	N	124	124	180	13,172	83	P	100	138	171	18,545
54	P	106	180	200	197,747	84	P	100	106	106	13,533
55	P	138	225	200	169,515						
56	P	200	225	277	168,312						

Note. M = Medicine, N = Nursing, P = Pharmacy