

## *Placement Test Analysis in a Japanese University*

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### **Abstract**

It was around 2009 that the so-called era of free college admissions began due to a shortage of college applicants. Along with this situation, the introduction of different types of admissions, such as Admission Office Examination (AO) and recommendation-based examinations, which may not require ordinary forms of written examination, raised the issue of widening ability gaps among new students. To cope with the situation, many universities implemented placement tests to place students according to their proficiency levels. Such strategies are believed to help students gain the needed support. At the same time, the placement tests can help instructors adjust the levels and contents of the classes accordingly. Like many other universities, the target university has implemented English and mathematics placement tests over the past ten years in response to lower academic proficiency and wider gaps among students. Recently a placement test for Japanese has been introduced since some students' were found to have limited general academic skills. The current study analyzes these three kinds of placement test results. The analysis involves numerical presentation, distributions, frequency, and correlations. The study found correlations between the three test results. Moreover, unique characteristics in placement test scores for different majors were revealed. It is believed that the results of the study can help review and improve current planning for support programs responding to continuously declining academic levels and widening gaps among students.

Keywords: placement test, students' proficiency level, admission styles

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## **Introduction**

A declining birthrate generally and a decrease in college age members of the population have created difficulties in gaining applicants for universities in Japan. To reach capacity levels, many universities have lowered their acceptance criteria and/or are now admitting applicants through varying admission methods. As a result, the selective functions of university entrance examinations have been claimed to be less effective. Given this situation, students' proficiency levels have become an object of scrutiny. Concerns have been raised regarding declining academic levels and a widening gap in student abilities.

## **Problem Statement**

The number of 18-year-olds in the Japanese population has been declining since 1992, reaching 1.18 million in 2014. Although the figure has steadied over recent years, the National Institute of Population and Social Security Research has claimed that the number of 18-year-olds will begin to decline again from 2018, falling below the 1 million in 2031. This situation may lead to more academically unprepared students. Various measures have been implemented to cope with declining academic abilities among students. Some universities provide remedial education and others provide placement tests to grade students according to their proficiency levels. These strategies are believed to help students gain a necessary degree of support as well as helping instructors adjust course levels and content accordingly.

The current study focused on a small private university. This university began implementing English and mathematics placement tests in 2007, and Japanese placement tests in 2014. The purpose of these tests was to identify students with low proficiency levels so that necessary support could be provided. However, each placement test is planned, implemented, and evaluated by the responsible faculties in their own subject area. How the results are used depends on decisions made in each faculty, and information regarding placement tests is not shared with other faculties.

## **Significance of the study**

Placement tests for various subject areas have been implemented at many universities. Given this, a better understanding of the overall situation regarding placement tests has become more important, with an analysis not only of individual subjects but of their general use required to assess them effectively. Moreover, a unified understanding of students' proficiency levels, their background, and their difficulties is necessary to gain accurate information. Based on shared information, collaboration among faculties, which is a key to success through providing a supportive environment for all students, can be fostered. However, there are few opportunities for information-sharing among university faculties. The current study aimed to challenge this limited information-sharing environment.

## **Purposes of the Study**

This study had three purposes, namely:

1. to examine the characteristics of different majors based on the results of three placement tests, comprising the subject areas of English, Japanese and mathematics;

2. to analyze relationships between the three placement test results;
3. to analyze the admission methods used for students with lower proficiencies.

The ultimate goal of this study was to provide practical results to assist with reviewing and modifying the current support system.

## **Research Design**

To achieve these three purposes, the following data collection and analysis methods were used.

To address the first purpose, data from three placement tests involving English, mathematics and Japanese were analyzed for their numerical values, distribution and frequencies.

To address the second purpose, data from the three placement tests were analyzed using a correlation approach.

To address the third purpose, detailed analyses for individual students categorized with lower proficiency levels in each test were extracted. Their scores and the admission methods involved were analyzed, using numerical values, distribution and frequencies.

## **Target Population**

A total of 165 new students at the small private university were involved in the study. This private 4-year-university has approximately 1,000 students, with two departments, the health science department and the nursing department. The study sample was drawn from the Health Science Department, which has majors in physical therapy (PT), occupational therapy (OT), and welfare and psychology (WP).

## **The Placement Tests Used at the University**

The university conducts placement tests for English, mathematics and Japanese. These placement tests are developed, implemented and evaluated by the faculties responsible for each subject. For English, all new students take the English placement test. Based on the test scores, English course coordinators decide the “cut-off line” to form a special class consisting of the 25–30 students with the lowest scores. These students stay in this class throughout the year. A placement test for mathematics is required for only the PT and OT students. Students with low scores are recommended but not required to take a basic mathematics class. For Japanese, a placement test is administered to all students. Students with low scores are placed into non-credit basic Japanese courses, consisting of a small number of students during the first semester. Based on their first semester grades, some students are recommended to continue their courses for the second semester.

## **Literature Review**

The literature review section focused on the following:

1. an overview of issues faced by universities in Japan;
2. the use of placement tests at Japanese universities;
3. studies of the placement test in relation to school grades;
4. studies of the placement test in relation to different admission tracks

## 1. An overview of issues faced by universities in Japan

According to the Ministry of Education, Culture, Sports, Science and Technology (MEXT), the number of college-bound 18-year-olds is about to reach its lowest recorded point and continue to decline, in what has been called the ‘2018 problem,’ creating in turn an issue for maintaining university admission quotas. In 2017, the number of private universities with unused enrolment capacity was 229, a reduction of 5.1% from the previous year. However, many universities, especially those serving local regions, are struggling with a shortage in the number of applicants and have developed alternative admission tracks to secure a higher enrollment rate. Such a situation is considered to raise serious issues concerning low student academic levels as well as contributing to an academic achievement gap among students.

## 2. Use of English placement tests at Japanese universities

With growing concern arising from their experience of first-year students, the numbers of universities in Japan using placement tests have been increasing. In 2002, Shimizu explored the use of English placement tests at universities offering four-year degrees, and found that 64 out of 200 universities were using placement tests and 8 were planning to use them. Although 104 universities responded that they did not have large-scale tests, 31 indicated that they were considering introducing placement tests. Sugimori (2008) surveyed 208 universities and found that 55.7% used placement tests to place students in classes based on their proficiency levels. Recently, Otani et al. (2014) conducted a survey involving responses from 16 universities, and reported that 12 used placement tests to place students into different classes. The kinds of tests used as placement tests vary, from commercial tests such as TOEFL, TOEIC or STEP to in-house tests. In principle, these placement tests are used for classifying students into different proficiency levels so that appropriate support can be provided and teaching efficiency increased. Although questions had been raised concerning the validity and reliability of the tests as well as the effectiveness of grouping students into different classes based on proficiency levels, these studies suggested facilitating working groups to plan, construct, implement, and evaluate the placement tests to identify a more appropriate and effective use of them.

## 3. Studies of the placement test in relation to school grades

The relationship between placement tests and school grades has been examined in several studies. Otani et al. (2014) studied an English placement test for placing students into three English class levels. The validity of the test was analyzed using standard deviations. The study examined the number of students who failed an English course for two semesters, before and after implementing the placement test. The study found the number of failed students decreased after implementing the placement test for the first semester. However, there was no decrease shown for the second semester. The researchers involved considered that the English proficiency gap among students after the first semester widened within the class and that the subsequent efficacy of the placement test was weakened.

Sato et al. (2016) found a weak to moderate correlation between the results of a mathematics placement test and the grades of first-year calculus students. However, the study also revealed that the correlation became weaker throughout the year.

Moreover, a comparison between the class formed according to the placement test results and randomly formed classes revealed that the former group showed a high correlation between first and second semester grades while the latter showed no correlation.

Ikegami (2013) focused on the results of a physics placement test and the course grades of 129 first semester physics students. The study found a moderate correlation between the placement test and the grades. Moreover, students who were placed in a basic course due to their lower proficiency levels showed an improvement in the main course.

A study by Obata (2014) involved 166 students, and examined the relationship between placement tests and student grades after three years. The sum of three placement scores, comprising English, mathematics and science, were used for the study. The study found a weak correlation between placement tests and the second and third year of study, whereas the grades from the first year had a strong correlation with the placement test scores. The study also found a strong correlation between the first-year grades and grades in later years. The study concluded that placement tests may help to predict later grades in subsequent college years, but not with precision.

These four studies showed a weak to moderate correlation between placement tests and grades, suggesting there is some benefit in placing students into different class levels based on placement test results. However, the studies by Otani et al. (2014), as well as by Sato et al. (2016), and Obata (2014), also revealed that such correlations became weaker over time.

Two studies have found other measurements to be useful, in association with placement tests, to determine students' later achievement. Belfield and Crosta (2012) used data drawn from a statewide community college system, involving two placement tests. The study found a weak correlation between placement tests and students' GPA. The study found that high school GPAs were useful for predicting many aspects of students' college performance, and have a strong association with college GPA.

Ookouchi and Yamanaka (2016) examined students' GPA and its relationship with a mathematics placement test, the educational background in high school, and entrance exam results. Based on the scores of the placement test, students were classified into 5 levels. Among those at the lowest level, 58.3% had the lowest GPA of the semester, below 1.5, and were at risk of not passing. Moreover, of 11 students who did not continue their courses, 9 were classified in the lowest level at the placement test. On the other hand, the students' high school education or their entrance examination results did not correlate with their placement results. These two studies found that students' high school GPA could be linked to their college performance.

Some studies have shown that placement tests can be effective, but not in the long-term. Other studies have shown that alternative measurements, such as high school GPA, are more accurate and reliable in predicting later student performance at university.

#### 4. Studies of the placement test in relation to different admission tracks

According to MEXT (2017), 56.1% of new students were admitted to universities in Japan in 2017 through the use of general examinations, while 43.7% entered using the recommendation-based method (34.8%) or AO tests (8.9%). Concerning private universities, 49.0 % of new students took general examinations, while 50.7% were admitted through the recommendation-based method (40.1%) or AO tests (10.6%). These percentage figures indicate a notable change from figures in 2010, where 65.8% were admitted through general examinations, while 33.1% were admitted through the recommendation-based method (31.7%) or AO tests (1.4%). Universities have increased their use of the recommendation-based method or AO tests as a means to secure more students. However, this change is considered to be causing a variation in academic abilities among university students, with claims that the students admitted through the recommendation-based method or AO tests were falling behind academically. The issue with students entering university through the recommendation-based method or AO tests is that these students' academic abilities are not clearly identified. Therefore, an early evaluation of these students' basic academic abilities is urgently required to know whether they are likely to complete college courses successfully.

Several studies have focused on the different admission methods used for determining student academic abilities. Ikeda (2009) examined the GPA average of two groups of students, that is, one group who entered university through AO tests and another group who were admitted through general entrance examinations. Based on the course grades for the first two years, the study concluded that there was no evidence that these two groups differed in their course grades.

Contrary to Ikeda's study, four other studies have found differences in academic ability among students depending on their admission method. Hirose (2016) compared students' placement tests and the grades of final examination among students who had enrolled in three different mathematics courses. In terms of their admission method, those who had taken general examination had higher grades compared to those who had not taken general examinations.

A study by Yamauchi et al. (2015) found that those who took the general examination, which has a required mathematics component, had higher scores in placement tests and performed better in mathematics courses.

Koyama et al. (2013) focused on three placement tests, involving the subject areas of chemistry, biology and physics. Their study revealed that those who were admitted through high school recommendation scored 10 points lower in chemistry, 2 to 3 points lower in biology and 8 points lower in physics, compared to students who had been admitted through the other recommendation base. Those who took general examinations scored more highly again than these two groups.

In summary, there has been no conclusive evidence found of a relationship between placement test scores and school grades, or of academic differences among students admitted through different admission methods. Students' educational backgrounds, the methods used for university admission, students' GPAs, and their course grades seem to be of varying value in understanding students, their difficulties and their

needs. Likewise, the placement test appears to be one further measure to assist with early identification of students' academic proficiency levels. Although reported studies have focused on the placement test, there has been little research done to provide an overview of all placement tests or a close examination of individuals who were classified as having low proficiency levels. Moreover, the universities in which these placement test studies were conducted are considered as relatively large, or well-known, or elite universities. Little work has been done on smaller, non-elite universities in this regard.

## Conclusions

The results of the study

This section presents the study results in terms of the four study purposes.

### 1. The characteristics of different majors based on the results of the placement tests

The followed table (Table 1) shows the results of three placement tests (mathematics, Japanese, and English). Scores have been converted into 100 points as full marks.

Table 1: Average score among the three subject majors of English, Japanese and mathematics

	English	Japanese	mathematics
PT	59.6 SD 6.55	82.8	62.1 SD 7.29
OT	53.3 SD 5.31	80.2	51.7 SD 6.69
WP	50.5 SD 6.86	81.9	N/A

As shown in Table 1, PT majors had the highest score in all three tests. There was a wide gap between OT and PT majors in terms of the average mathematics result, and between WP and PT majors in terms of the average English result.

### 2. The relationships between three placement test results

To examine whether relationships exist between the three tests, a correlational analysis was performed. The following tables (Table 2 to Table 5) indicate the results of the analysis.

First, the analysis focused on the relationships between the three tests. For this analysis, WP students were excluded as they do not take a mathematics test.

Table 2: English, Japanese and mathematics test correlations for PT and OT students

		English	Japanese	mathematics
English	Pearson correlation	1	.285**	.448**
	Sig. (2tails)		.001	.000
	N	138	138	138
Japanese	Pearson correlation	.285**	1	.067
	Sig. (2tails)	.001		.438
	N	138	138	138

\*\* p < .001

As evidenced in Table 2, a weak correlation (.285, p < .001) was found between the Japanese and English scores. A moderate correlation (.488, p < .001) was also found between the English and mathematics scores.

The next two tables (Table 3 and 4) show results for examined PT and OT students separately.

Table 3: English, Japanese and mathematics correlations for PT students

		PT English	PT Japanese	PT math
PT English	Pearson correlation	1	.296**	.485**
	Sig. (2tails)		.004	.000
	N	92	92	92
PT Japanese	Pearson correlation	.296**	1	.131
	Sig. (2tails)	.004		.212
	N	92	92	92

\*\* p < .001

Table 3 shows the results for PT students. A weak correlation (.296, p < .001) was found between the Japanese and English scores. A moderate correlation (.485, p < .001) was also found between the English and mathematics scores.

Table 4: English, Japanese and mathematics correlations for OT students

		OT English	OT Japanese	OT math
OT English	Pearson correlation	1	.250	.259
	Sig. (2tails)		.094	.082
	N	46	46	46
OT Japanese	Pearson correlation	.250	1	-.124
	Sig. (2tails)	.094		.410
	N	46	46	46

\*\* p < .001

On the other hand, Table 4 shows that there were no significant correlations between the three tests for OT students.

The followed table (Table 5) shows the result of the correlation analysis for WP students.

Table 5 Correlation of English and mathematics for WP students

		WP English	WP Japanese
WP English	Pearson correlation	1	.585**
	Sig. (2tails)		.001
	N	27	27

\*\* p < .001

Table 5 indicates a strong correlation (.585, p < .001) between the Japanese and English scores among WP students.

### 3. The admission methods used for students with lower proficiencies

Students classified as having lower proficiency levels based on the scores of the three placement tests have been identified. The number of these students for each different major and for each subject is described in Table 6.

Table 6: Students classified as having lower proficiency levels

Majors	mathematics	Japanese	English	Cumulative total	Total	%
PT	26	19	8	53	42	45.7
OT	20	14	11	45	34	73.9
WS	n/a	8	6	14	8	29.6
	46	41	25	112	84	

As shown in Table 6, students with low proficiency levels comprised 46 students in mathematics, 41 in Japanese and 25 in English, making a cumulative total of 112. However, some student names overlapped because they were enrolled in more than one subject. Therefore, the total numbers from each department are shown in the Total column, while the leftmost column indicates the proportions in each major. Eighty-four out of 165 students (50.9%) were found to have low proficiencies in one or more subject areas. Table 7 shows the number of students in multiple subject areas.

Table 7: Students taking multiple classes due to low proficiency levels

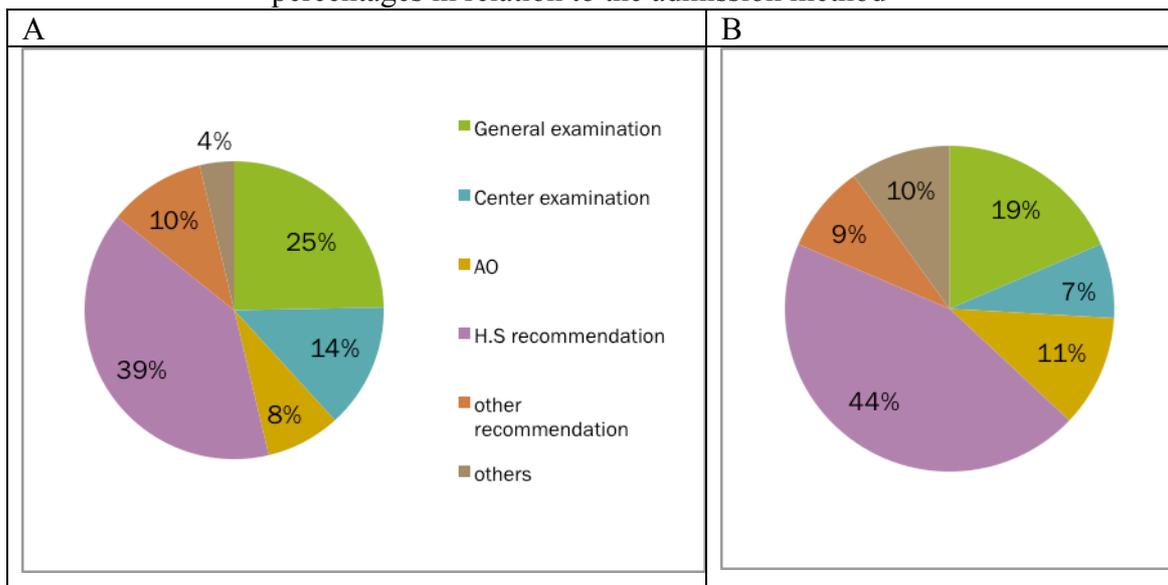
Majors	M x J x E	M x J	M X E	J x E	Total
PT	2	2	6	1	11
OT	3	6	1	1	11
WP	n/a	n/a	n/a	6	6
	5	8	7	8	28

M: mathematics, J: Japanese, E: English

Table 7 indicates that 2 PT students and 3 OT students were classified as having low proficiency levels in all subjects, namely in mathematics, Japanese and English. Six WP students were considered as having low proficiency in Japanese and English (J x E). Regarding PT students, 11 students comprising 12 % of the total number of PT students were classified as having low proficiency levels in more than one area. Concerning OT students, 11 students comprising 24 % of the total number of OT students were classified as having low proficiency levels in more than one area, and 6 students comprising 22% of the total number of WP students were classified as having low proficiency levels in more than one area. Overall, as noted, 84 out of 165 students (50.9%) were considered as having low proficiency levels in one or more subject areas.

The following table (Table 8) compares the percentages of different admission methods, including general examination, center examination, AO, high school recommendation, other types of recommendation, and others for all new students in 2017 (A) with the percentages of students with low proficiency levels in one or more subject areas (B), in relation to the admission method.

Table 8: Different admission method percentages compared to low proficiency level percentages in relation to the admission method



As shown in Table 8 (A), new students taking subject examinations comprised 25% through general entrance examination and 14% through center examination (14%), while the rest, comprising 61 % in total, were admitted without subject testing. Table 8 (B) shows the percentage breakdown of students with low proficiency levels in relation to admission method. A total of 44% entered the university through high school recommendation and 26% took subject examinations, comprising 19% for general entrance examinations and 7% for center examinations, for university admission. In other words, 74% had not taken subject examinations.

## Discussion

The results reveal that there are differences among the three majors. PT students showed the highest average scores in all three tests and significant correlation was found between their tests. The Japanese and English scores for WP students also correlated. However, OT students' scores did not show any significant correlations. These results imply that PT and WP students who have low proficiency levels in a particular subject tend to have low scores in other subject areas. In other words, PT and WP students with low proficiency levels are likely to have low academic abilities overall. This situation does not apply to OT students. The reason may be that OT students with low proficiency levels tend to have a specific weak subject. Another difference found among different majors was the percentage of students classified as having low proficiency levels in one or more subject areas. In total, 84 out of 165 sample students, that is 50.9%, were considered as having a low proficiency level in one or more subject areas. When individual departments were focused on, it was found that 45.7% of PT students, 73.9% of OT students and 29.6% of WP students were classified in this category. These distinctive results for each major should be taken into account in implementing support systems. A careful consideration of course content, the focused levels, and supportive strategies for those students with low proficiency levels as well as for those with better proficiency levels is necessary, based on the differing results for each major. For example, the focus and aims of the curriculum could perhaps be different in the OT department, where three-fourths of students were considered as having some kind of difficulty, compared to PT or WP departments.

Regarding admission methods, this study revealed that approximately 60% of new students did not take subjects tests for their entrance examination. It also confirmed that over half of new students had difficulties in one or more subject areas on entering university. In respect of students with low proficiency levels, 75% had not taken subject tests for their admissions and nearly one-fifth had low scores in multiple subject areas. Effective support systems need to be urgently implemented to ensure that these students possess the skills and knowledge necessary to continue college study, pass the National Examinations which are needed for working in the field, and to graduate from school. There are several possible approaches that could be taken to improve the current situation. One option might be to reduce the allocation for the recommendation-based method and AO admissions. However, it would not be easy to implement such a strategy since securing a sufficient number of applicants is a major priority for universities. Another option might be to review and strengthen pre-entry to university education. Since certain admission methods do not require subject tests, students using those methods may not study as much as those who take general entrance exams. Their academic abilities are unassessed through examinations until they take placement tests and start college courses. Well planned pre-education is considered to encourage students' motivation to study and to work on acquiring the necessary skills for university, even though significant progress within a short time period is unlikely.

### **Limitation of the study**

Since this study focused on a small university, the sample size was small. Additionally, the number of students within the three different majors varied. These limitations make generalization of the study results difficult. However, as stated in the study, this study was also intended to help encourage the sharing of information among the various faculties so that a better understanding of the students and collaboration for building supportive education could be promoted. This study should be on-going, and should involve obtaining student data every year and doing follow-up study on students to gain accurate information on student difficulties and progress.

In addition, a review of the current pre-education system is urgently required. The university provides pre-entry education for those admitted early through the recommendation-based method. However, this pre-entry education is planned and implemented by individual departments. Information sharing among faculties and investigation of current pre-entry education should be undertaken.

Finally, it should be noted that, despite having many new students academically underprepared, the university has a good record for students passing the National Examinations. Concerning the National Examinations, the university has the highest passing rate for PT and the second highest rate for OT among tertiary universities in Japan. Therefore, the challenge facing the university is to bring students with low proficiency levels up to a standard sufficiently high to pass the National Examinations, to enable them to work in their designated field.

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