Analysis of Three Placement Test: Their Roles and Prospects

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Abstract
Many universities in Japan, specifically in the private sector in local areas, have been struggling to secure applicants because of the declining number of 18-year-old population. These universities have lowered their acceptance criteria to reach their capacity levels. Consequently, concerns have been raised regarding the declining academic levels and widening gaps among students. To cope with this problem, universities have implemented placement tests to place students according to their proficiency levels so that appropriate support can be provided. Meanwhile, most universities provide freshmen seminars designed to help students build the basic knowledge and fundamental skills required for academic studies. These strategies are believed to help students gain the support they need to continue their academic work without dropping out of school. This study aims to analyze placement test scores and GPA scores. The target population comprised 100 new students who took three placement tests–English, Mathematics, and Japanese–at a local private university. The study analyzes the results of the three placement tests and their GPA scores. The analysis involves numerical presentation, distributions, frequency, and correlations. The study found correlations between the three test results and the GPA. Moreover, the unique characteristics of placement test scores with different majors were revealed. It is believed that the results of the study can help review and improve the current freshmen seminar class and basic liberal arts subjects, such as basic Japanese writing, basic mathematics, and first- year students' English.

Keywords: Placement Test, Academic Proficiency, GPA, Freshman Seminar, Analysis of Three Placement Tests —Their Roles and Prospects

Introduction

The decline in the 18-year-old population has had a considerable impact on universities in Japan, which implement various strategies to cope with filling their capacity levels. Among such strategies, employing early and varying admissions are an increasing tendency. However, such strategies are believed to hinder the selective functions of university entrance examination. As a result, students' academic levels are becoming a growing concern. In fact, such phenomena has been observed in private sectors, especially in small local universities.

Problem Statement

The number of 18-year-olds in the Japanese population had been declining since 1992, and was broadly flat from 2009 to 2018, at 1.18 million. This number then further declined, reaching 1.06 million in 2023. The National Institute of Population and Social Security Research has estimated that the number of 18-year-olds will fall to 98 million in 2032 and below 88 million by 2040. In such a situation, to secure applicants, universities have to accept more students with lower academic levels. Universities face the challenges of maintaining the quality of education as well as supporting such underprepared students.

Various measures have been implemented to cope with declining academic abilities among students. Many universities provide remedial education and freshman seminars, which provide basic knowledge and skills needed for university classes. Others implement placement tests to grade students according to their proficiency levels. Formation of ability-based classes seeks to provide appropriate support for each level while it helps instructors adjust course levels and content accordingly. However, as the number of academically lower students increases, the roles of placement tests should be re-examined.

The current study focused on a small private university that began implementing English and mathematics and Japanese placement tests in 2007 and 2014, respectively. The purpose of these tests is to identify students with low proficiency levels so that necessary support can 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. Like other universities, the subject university has been accepting more underprepared students, which seems to be due to employing various admissions. In such situations, the role and use of placement tests become more critical. Therefore, gaining a complete picture of the placement tests as well as considering their effective use is necessary.

Significance of the Study

Placement tests for various subject areas have been implemented at many universities. In terms of responsibilities, one of the top priorities of universities is to support students with low academic proficiency. Given such a situation, a better understanding of the placement tests has become more important and consideration of their effective use of is necessary. Examination not only of individual subjects but also an overall view of placement tests is urgently required. This study sought to derive a comprehensive understanding of students' academic proficiency levels. Moreover, we focus on the relationship between placement score and individual grade point average (GPA). Such analysis will provide more accurate information necessary for providing a supportive environment by all involved faculties. Such information can help in reviewing and improving the current freshmen seminar class and

basic liberal arts subjects, such as basic Japanese writing, basic mathematics, and first-year students' English.

Background Information

1. Overview of the current issues faced by universities in Japan
2. Types of admissions and entrance examinations at Japanese university
3. GPA system in Japan
4. Roles and use of placement tests at Japanese universities

1. Overview of Current 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 reached a record low of 1.06 million in 2023. Although the enrollment rate reached a record high of 57.7% for eight consecutive years, many universities, especially those serving local regions, are struggling with a shortage in the number of applicants. These universities cannot achieve their enrollment quotas, which is a serious issue. According to Promotion and Mutual Aid Corporation for Private Schools of Japan, 53.3% of universities did not meet their enrollment quotas. Moreover, as of August 30th, 2023, a total of 92% of private universities did not achieve their enrollment quotas. These figures marked the highest rate since the start of their survey.

To address these issues, many universities have actively incorporated early admissions or alternative admission tracks to secure higher enrollment rates. Such strategies are considered to cause variations in academic abilities among students, with claims that students admitted through these routes are falling behind academically. These students' academic abilities are not clearly identified until they take a placement test at the beginning of the school year.

2. Types of Admissions and Entrance Examination at Japanese University

The figure below presents various types of admissions at Japanese university.

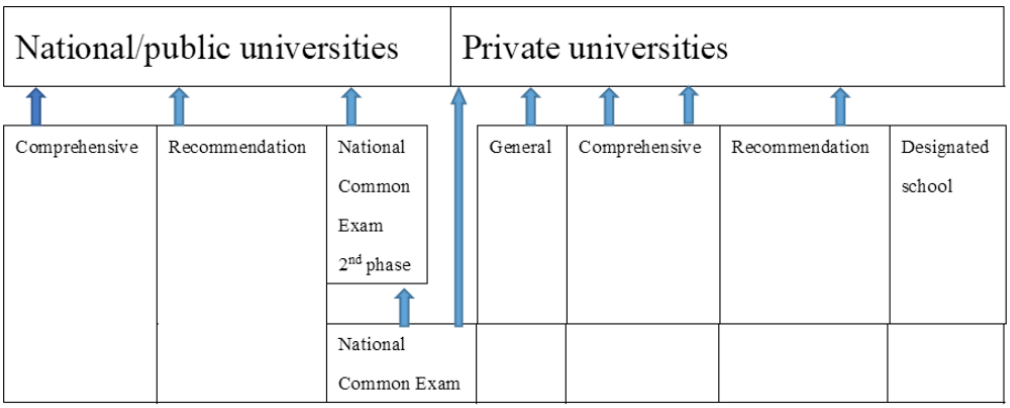

Figure 1: Types of admissions

In addition to comprehensive selection and recommendation admission, general or national common examination measure students' academic proficiencies through various subject tests. These types of admission basically do not have subject tests, and instead include presentations, group discussions, writing thematic essays for admissions. Another form is designated schools from which universities have agreed to accept a set number of students

from contracted high schools. According to MEXT, 49.7% of new students were admitted to private universities in Japan in 2022 based on general examinations, while 51.2% entered using the recommendation-based method (31.0%) or comprehensive selection (19.3%). In terms of private universities, 48.8% of new students took general examinations, while 51.2% were admitted through the recommendation-based method (31.5%) or comprehensive selection method (19.7%). These figures for private universities indicate a notable change from 2020, where 52.0% were admitted through general examinations, while 47.8% were admitted through the recommendation-based method (34.4%) or comprehensive selection (13.4%). Universities have increased their use of recommendation-based or comprehensive methods as a means to secure more students.

3. GPA System in Japan

GPA is a standardized means of measuring academic achievement on a scale of 0 to 4. The score is calculated by multiplying the "total number of credits by grade (A+, A, B etc.)" and "corresponding grade point (4 for A+, 3 for A, etc.)," then adding the obtained figures for all grades and dividing the result by the "total number of registered credits," which includes courses that resulted in a fail. The formula is indicated below.

$$\frac{(\text{No. of A}^{+}\text{credits}\times \mathbf{4}) + (\text{No. of A credits}\times \mathbf{3}) + (\text{No. of B credits}\times \mathbf{2}) + (\text{No. of C credits}\times \mathbf{1}) + (\text{No. of Falling grades}\times \mathbf{0})}{\text{Total No.of registered credits}}$$

GPA is an internationally recognized measure of a student's performance. Furthermore, GPA may be used for selecting students for prizes and scholarships, awarding degrees with honors, or setting minimum entry levels for higher education programs.

Responding to globalization, international system prevalent. The GPA system has been introduced to Japan. According to a study by JUDGIT, as of 2018, a total of 92.2% of Japanese universities employ the GPA system. Belfield and Crosta (2012) and Ookouchi and Yamanaka (2016) investigated GPA and established that students' high school GPA could be linked to their college performance.

4. Roles and Use of Placement Tests in Japanese Universities

With growing concern arising given first-year students' experiences, the number of universities in Japan using placement tests has exhibited an increasing trend. Although subjects and use of placement tests varies, they are usually used to identify new students' academic proficiencies as well as to group students for class formation.

Some universities use commercialized or standardized tests while others make their own placement tests. Previous research has examined the relationship between placement tests and school grades (Otani et al. ,2014; Sato et al. ,2016; Ikegami, 2013; Obata, 2014) and documented a weak to moderate correlation between placement tests and grades, and that such correlations became weaker over time. Such research suggests there is some benefit in placing students into different class levels based on placement test results.

In summary, no conclusive evidence of a relationship between placement test scores and college GPA has so far been presented. Moreover, the available studies focus on students from various majors, and few investigate students intention to work as human service professionals, such as physical therapists, occupational therapists, or counselors.

Purpose of the Study

The purpose of this study is threefold:

1. Analyze the three placement tests (English, Japanese, Mathematics) results,
2. Analyze relationship among placement test scores and GPA,
3. Examine the characteristics of different majors in terms of placement test scores and GPA.

The ultimate goal is to assist with reviewing and modifying the current support system, such as pre-entered education, remedial education, proficiency level-based class formation, and the freshman seminar through the practical results derived.

To achieve our research purposes, we adopted the following data collection and analysis methods:

- To address the first objective, data from the three placement tests were analyzed using numerical presentation, distributions, frequency, and correlations.
- To address the second, students' placement test scores and their GPA at the end of the first year were analyzed based on a distribution and correlation approach.
- To address the third, we performed detailed analyses of three placement tests and GPA based on different majors using numerical values, distribution and frequencies, as well as correlations.
- IBM SPSS statistics and Microsoft Excel are used for analysis.

Target Population

A total of 120 first-year students from a small private university participated in this study. This private 4-year-university has approximately 1,000 students, with two departments, health science and nursing. The study sample was drawn from the health science department, which has majors in rehabilitation (physical therapy (PT) and occupational therapy (OT)), and human communication (HC).

Placement Tests and GPA System 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 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. The information on students' scores is used for the freshman seminar while some students with lower scores are recommended to take non-credit Japanese course.

Regarding the GPA system, individual students' GPAs are calculated each semester and used for the decision for moving up to the next grade level as well as for graduation criteria.

Conclusions

Results

This section presents our results regarding (1) placement test results, (2) GPA results, and (3) correlation analysis among placement test scores and GPA while revealing the characteristics of different majors.

1) Placement Tests Results

The results of three placement tests (mathematics, Japanese, and English) are reported in Table 1.

	English	Japanese	mathematics
PT	50.3	55.4	52.5
OT	51.8	58.2	48
HC	46.8	57.4	N/A

Table 1: Average scores among the three subjects English, Japanese, and mathematics

As presented in Table 1, OT majors had the highest scores for English and Japanese tests. A significant difference in average scores was observed between OT and PT major students in mathematics, and between HC and OT majors in terms of the average English score.

Figures 2, 3, and 4 present box plots of the distributions, central tendencies, and variabilities of each placement test among the different majors.

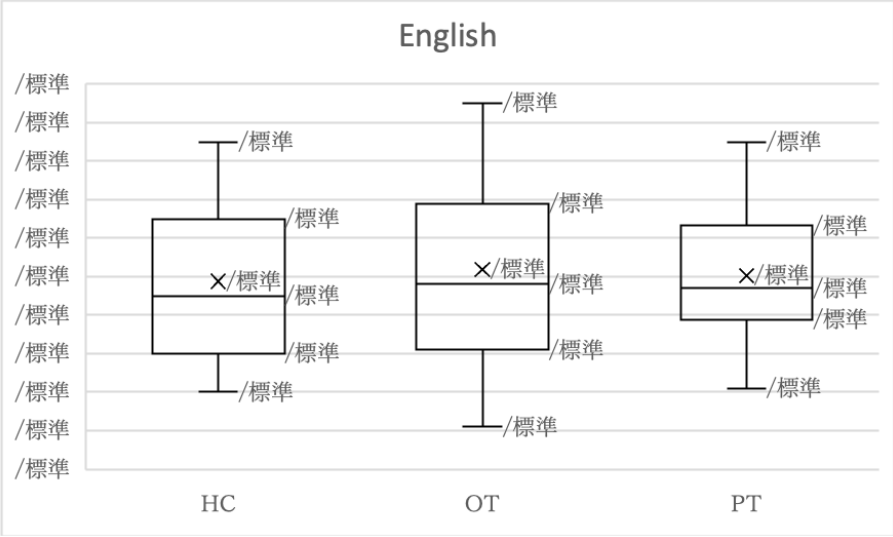

Figure 2: Box plot of English placement test

As indicated in Figure 2, OT has a more dispersed distribution, while PT students' score exhibit a more concentrate and positive skewed distribution.

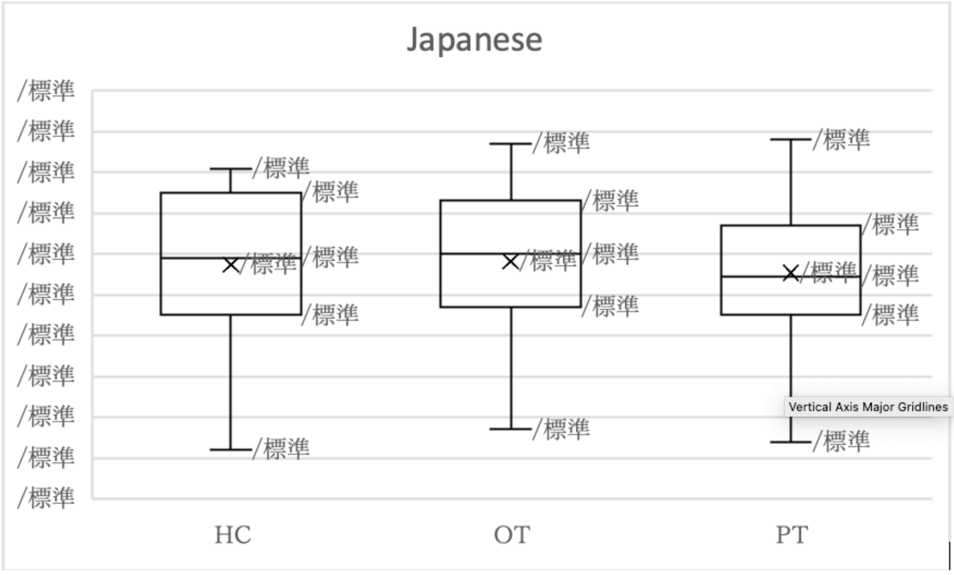

Figure 3: Box plot of Japanese placement test

The results of the Japanese placement test are presented in Figure 3, which reveals a more concentrated distribution for PT department students.

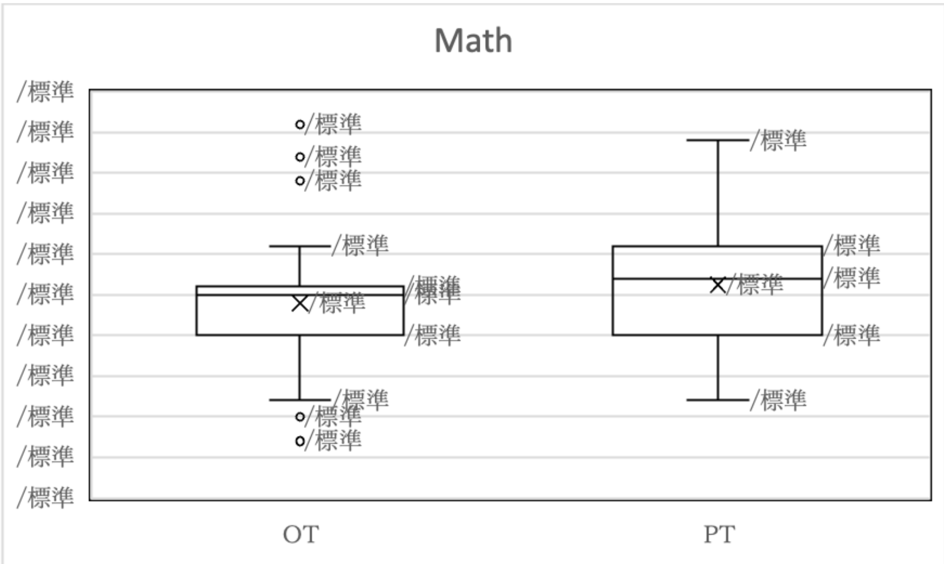

Figure 4: Box plot of mathematics placement test

Figure 4 presents a box plot of the results of the mathematics placement test. Despite the highest average scores on English and Japanese tests, OT students have significantly lower scores for the mathematics test compared to PT students. A lower skewed distribution is observed as well as more outliers.

2) Results of GPA

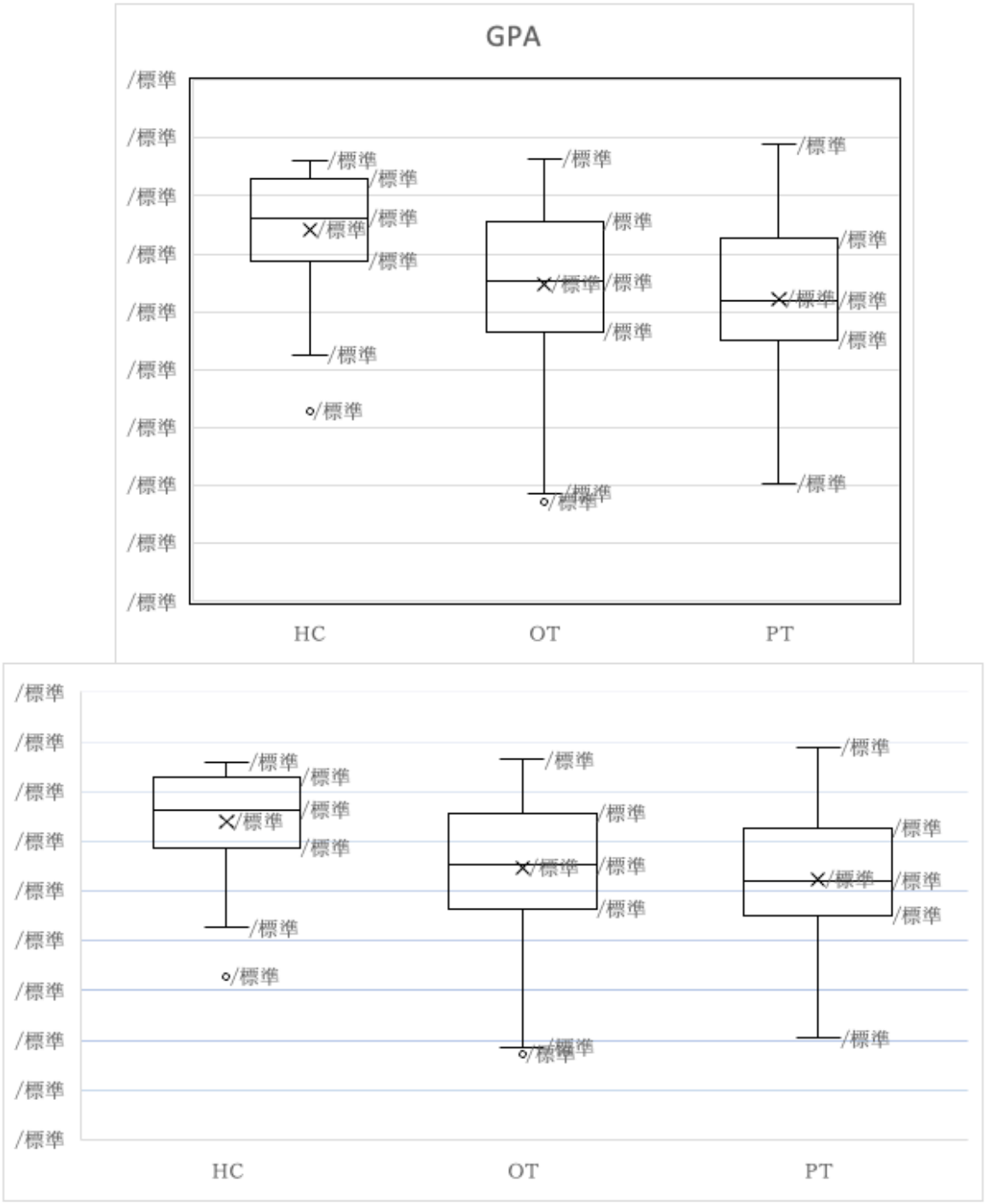

Figure 5: Box plot of GPA

As illustrated in Figure 5, the HC department has significantly better GPA scores, with the average 3.2. while OT and PT students score an average of 2.7 and 2.6, respectively. However, before drawing any conclusions, careful examination and consideration of these scores may be needed.

3) Correlation Analysis Among Placement Test Scores and GPA

The results of correlational analysis of English, Japanese, and mathematics tests as well as GPA are reported in Table 2.

		English	Japanese	Math	GPA
English	Pearson's correlation	1	.549**	.615**	.382**
	Sig. (2 tails)		.000	.000	.000
	N	120	120	97	118
Japanese	Pearson's correlation	.549**	1	.316**	.423**
	Sig. (2 tails)	.000		.002	.000
	N	120	120	97	118
Math	Pearson's correlation	.615**	.316**	1	.360**
	Sig. (2 tails)	.000	.002		.000
	N	97	97	97	95
GPA	Pearson's correlation	.382**	.423**	.360**	1
	Sig. (2 tails)	.000	.000	.000	
	N	118	118	95	118

**. $P<0.01$ *. $P<0.05$

Table 2: Correlational analysis of placement tests and GPA

According to Table 2, weak to moderate, and even fairy strong correlations exist among them. Moderate correlation (.549, $p < .001$) was determined between the Japanese and English scores. Furthermore, a strong correlation (.615, $p < .001$) was also observed between the English and mathematics scores. Regarding the correlations with GPA, weak to moderate correlations were established between each placement test and GPA: English (.382, $p < .001$), Japanese (.423, $p < .001$), and mathematics (.360, $p < .001$).

Next, students' score of all three placement tests were summed up and correlational analysis performed with GPA for each department.

	GPA OT	GPA HC	GPA PT
Peason's correlation	.608**	.529**	.439**
Sig. (2 tails)	.000	.009	.000

**. $P<0.01$

Table 3: Comparison of correlational values

According to Table 3, fairly strong correlation (.608, $p < .001$) for OT, moderate correlation (.529, $p < .001$) for HC, and somewhat weak correlation (.439, $p < .001$) for PT were revealed.

Summary of Findings

Regarding the placement tests, three points are notable:

First, a fairly strong correlation between mathematics and English (.615, $p < .001$) and English and Japanese (.549, $p < .001$), and weak correlations between Japanese and mathematics (.316, $p < .001$) were determined.

Second, OT students have the highest average scores in English and Japanese placement tests while they have significantly low scores on the mathematics test and scores tend to be lower overall.

Third, box plots revealed wide proficiency levels (gap) among OT students, compared to PT or HC students.

For GPA, we observed the following differences in different majors. HC students have the highest GPA average (3.2), with the highest and lowest of 3.8 and 2.13, respectively. Furthermore, the results revealed a more concentrated distribution. For OT students, the average GPA was 2.7, with the highest and lowest of 3.82 and 0.92, respectively. For PT students, the average was 2.6, with the highest and lowest of 3.94 and 1.02, respectively. The latter two majors exhibited similar distribution patterns.

Finally, the correlational analysis revealed a moderate to fairly strong correlation between the total scores of the three placement tests and the GPA. The degree of correlational differences varied by department, while OT major exhibited a strong correlation (.608 $p < .001$) and PT major had relatively moderate correlation (.439).

Implications

As moderate to strong correlations were found between placement tests and GPA, the latter could be used as a predictor of early failures or at-risk students. Simultaneously, the track of at-risk students needs to be followed so as to avoid drop out or failing. Then, data can be used to review current support systems, such as pre-entered program, low proficiency level classes, and freshman seminar.

Further Investigations

Further investigations focused on the following points are necessary:

First, a careful examination of the GPA score is required. This study revealed distinctive differences among different departments in terms of the GPA. A more detailed examination of each department's background information is necessary. Furthermore, so-called GPA inflation should also be examined.

Second, to provide more individualized and appropriate support for students, the continuation of the study and data accumulation is urgently needed.

Finally, classifying GPA into high, medium, and low groups and examining the tendencies may provide a better understanding of the overall situation.

Limitations

As this study focused on a small university, the sample size was relatively small, which makes generalization of the results difficult. However, this study was also intended to help build a more supportive educational environment based on the results. Moreover, the study should be on-going, and should involve accumulating data every year and follow-up research on individual students to gain accurate information on their difficulties and progress.

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