

# Poor and Low Academic Performance: A Case Study of the 2014 Freshman Class

学業不良と低レベル学業達成度についての検討

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**Keywords :** GPA, performance based academic assessment, early identification (早期発見), Academic Ability Test (学力テスト), early intervention (早期介入)

## Introduction

This research reports and discusses the results of a case study on the first semester data for the 468 freshmen who matriculated at Edogawa University in 2014. The report consists of descriptive statistics by department in three areas: ① attempted credits (履修登録単位数), ② earned credits (取得単位数), and ③ GPA (学業平均値)<sup>i</sup>. This data is compared with the data previously reported for the 2013 freshmen class (Kelly 2014). Lastly, ④ the correlation between the Academic Ability Test (学力テスト) and first-term Academic Performance is examined using inferential statistics.

This report is part of a larger co-operative research project that has been generously funded by Edogawa University for the 2014 academic year.

## Method

### GPA Calculations

As previously reported (Kelly 2014) neither GPA nor the number of attempted credits is indicated on the students' report card (成績通知書)<sup>ii</sup>. Attempted credits for each student were calculated as the sum of credits in each grade (A+秀・A優・B良・C可・D不可)<sup>iii</sup>. The number of earned credits for each student was collected directly from individual report cards. After converting the data from pdf format to an Excel table, the number of credits earned for each grade was counted using Excel's COUNTIFS function. Each student's GPA was calculated using the following formula:

$$\text{GPA} = \frac{(\text{Aplus} \times 4) + (\text{A} \times 3) + (\text{B} \times 2) + (\text{C} \times 1)}{\text{Aplus} + \text{A} + \text{B} + \text{C} + \text{D}} \quad \text{iv}$$

The mean GPA for each department was calculated in the same way.

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2014年11月30日受付

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GPA Variance

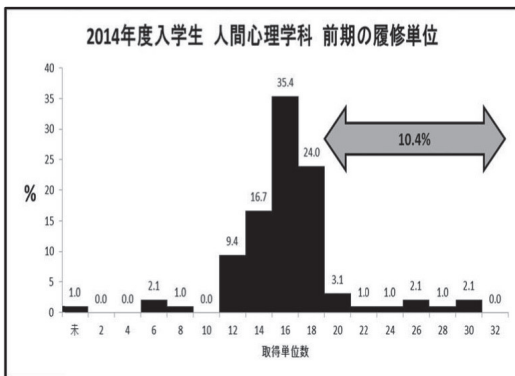
By department the variance of GPA averages between the first-term of 2013 and the first-term of 2014 was analyzed using the appropriate t-test in Excel's add-on statistical tools.

Academic Ability Test and Academic Performance (GPA)

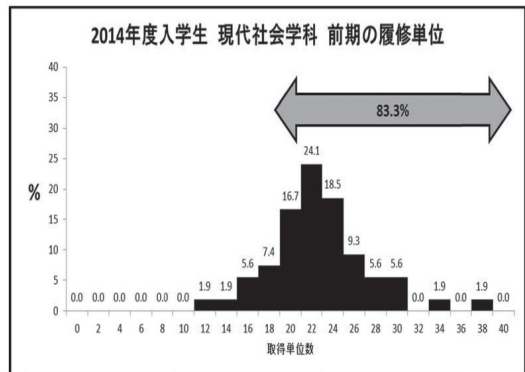
The correlation coefficients for raw scores on the Academic Ability Test administered during Freshman Orientation under the auspice of the Center for Fundamental and Liberal Education (基礎・教養教育センター) and GPAs were generated by department using Excel's CORREL function. To further determine the relationship between the scores on the Academic Ability Test and first-term GPA performance, partitioned chi-squared tests were performed using Excel and verified with SPSS.

Results ① Attempted Credits

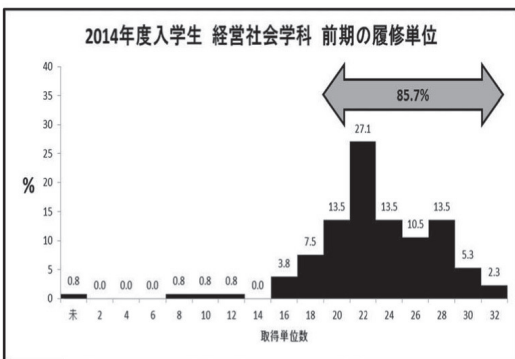
Histograms of attempted credits by department are shown in Graph 1.1 through Graph 1.6. To facilitate comparison between departments having different enrollment numbers, histogram frequencies for attempted credits were converted to and appear as percentages in the graphs.



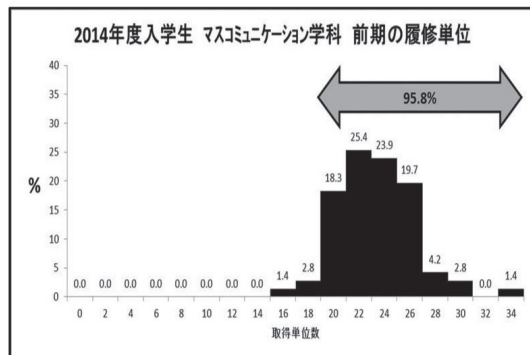
Graph 1.1 Dept. of Psychology & Humanities



Graph 1.2 Dept. of Contemporary Society

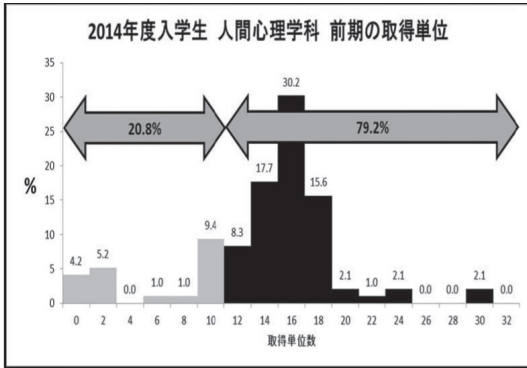


Graph 1.3 Dept. of Business Management

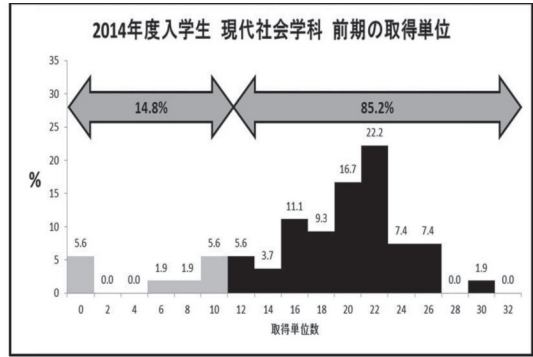


Graph 1.4 Dept. of Mass Communication

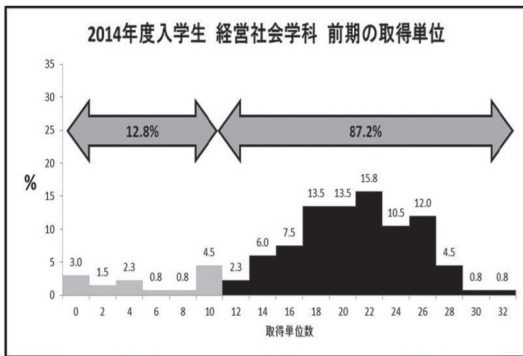




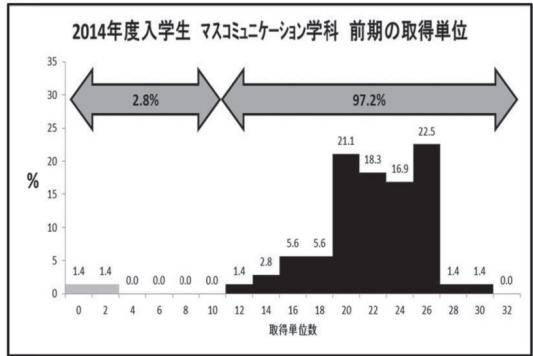
Graph 2.1 Dept. of Psychology & Humanities



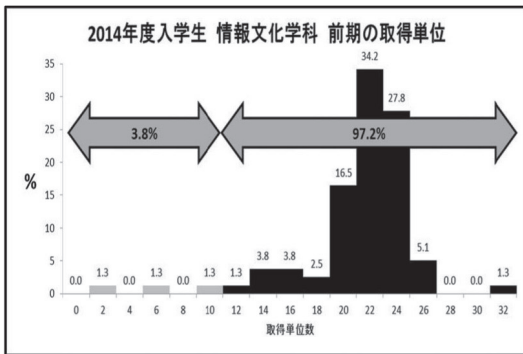
Graph 1.2 Dept. of Contemporary Society



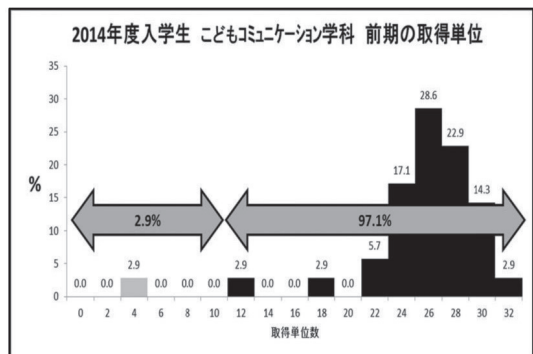
Graph 2.3 Dept. of Business Management



Graph 2.4 Dept. of Mass Communication



Graph 2.5 Dept. of Business & Communication



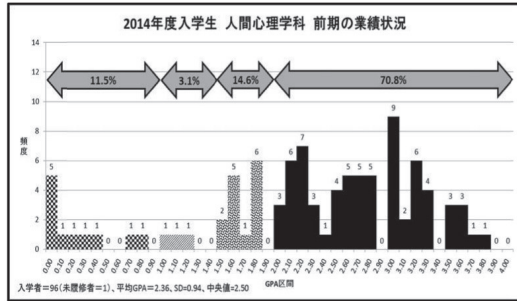
Graph 2.6 Dept. of Childhood & Communication Studies

students had GPAs ranging from 2.00 to 2.17, which is either on or slightly above the 2.00 threshold for acceptable academic performance.

### Results ③ GPA

GPA histograms by department are shown in Graphs 3.1 through 3.6. The median (中央値) GPA and standard deviation for each are also given. The arrows spanning the width of the graph indicate the percentage of students in the department with, from left to right, a GPA of less than 1.00 (checked

pattern), 1.00 to 1.49 (diagonal line pattern), 1.50 to 1.99 (spotted pattern), and 2.00 or more (solid color). The group with a GPA of less than 1.00 is classified as students with Poor Academic Performance; the 1.00 to 1.49 group as students with Seriously Low Academic Performance, and the 1.50 to 1.99 group as students with Low Academic Performance. A GPA of 2.00, which is below the mean and media GPA of all departments, marks the threshold of Acceptable Academic Performance.



As previously reported (Kelly 2014), the GPA scores of the 2013 freshmen in the Dept. of Mass Communication were dramatically skewed left. At that time it could not be determined whether this skewing was a function of so-called easy grading criteria or whether it was inherent to a grading system in which the grade of A is awarded for 80-100, that is, twice the range either B or C grades. The grading system of 2014 addressed this problem by dividing the 80 to 100 range into A (優) 80-89 and A+ (秀) 90-100. Graph 3.4 shows that the 2014 freshmen also exhibited a strong left skew with a mean GPA of 2.78 and a median GPA of 3.00. Fig. 2 below shows that in the first-term of 2013, 65% of the earned credits in the Dept. of Mass Communication were graded A; Fig. 1 shows that for the same 80 to 100 range in 2014, the percentage rose to 67.4% (A+ 37.4% and A 30%). By way of contrast, the Dept. of Business & Communication, which has the next highest mean, the 80 to 100 range was also high at 64.5%, however, the split between A+ and A was 17.6% and 46.9% respectively. Compared with all departments, the A+ 37.4% figure is 50% higher than two and 100% higher than three.

Fig.1 2014 Freshman Class Academic Performance by department

2014年度入学生 1年前期終了 学科別学業パフォーマンス

学科・在籍状況	履修単位	取得単位	評価別 (単位数・%)					GPA		
			秀	優	良	可	不可	平均値	中央値	SD
人間心理 96人	1556	1352	404 26.0%	412 26.5%	288 18.5%	248 15.9%	204 13.1%	2.36	2.50	0.94
現代社会 54人	1228	968	314 25.6%	270 22.0%	236 19.2%	148 12.1%	260 21.2%	2.19	2.43	1.05
経営社会 133人	3048	2526	562 18.4%	732 24.0%	730 24.0%	502 16.5%	522 17.1%	2.10	2.10	0.77
マスコミュニケーション 71人	1658	1526	620 37.4%	498 30.0%	232 14.0%	176 10.6%	132 8.0%	2.78	3.00	0.88
情報文化 79人	1792	1674	316 17.6%	840 46.9%	352 19.6%	166 9.3%	118 6.6%	2.60	2.73	0.74
子どもコミュニケーション 35人	956	888	154 16.1%	314 32.8%	262 27.4%	158 16.5%	68 7.1%	2.34	2.29	0.73

Fig.2 2013 Freshman Class Academic Performance by department

2013年度入学生 1年前期終了 学科別学業パフォーマンス

学科・在籍状況	履修単位	取得単位	評価別 (単位数・%)				GPA		
			優	良	可	不可	平均値	中央値	SD
人間心理 88人 (+休学1名)	1776	1446	814 45.8%	336 18.9%	296 16.7%	330 18.6%	1.92	2.00	0.69
現代社会 51人	1184	900	484 40.9%	214 18.1%	204 17.2%	282 23.8%	1.76	2.00	0.88
経営社会 116人	2992	2298	1110 37.1%	572 19.1%	616 20.6%	694 23.2%	1.70	1.74	0.71
マスコミュニケーション 88人 (+休学1名)	2124	1828	1380 65.0%	250 11.8%	198 9.3%	296 13.9%	2.28	2.55	0.76
情報文化 53人	1204	1044	830 68.9%	162 13.5%	52 4.3%	160 13.3%	2.38	2.70	0.77

Fig.1 and Fig.2 above provide descriptive statistics for the 2014 and 2013 Freshman Classes respectively. The number of credits awarded for each grade and its percentage of the attempted credits is given. To determine whether there is a statistically significant difference between each department's 2013 and 2014 averages for the first-term, t-tests were conducted. In that the grading system for students matriculating in 2014 has changed, for conducting t-tests (2-Tail,  $\alpha=.05$ ) it was necessary to convert the new 4-point GPA system to the previously used 3-point GPA system by merging the A (秀) grade with the B (優) to match the 80 to 100 range of the previous system's range for A (優). The 2014 converted averages (cM) and the t-test results are as follows:

- ①Dept. of Psychology & Humanities cM=2.07; t (181) = -1.49, p=.138
- ②Dept. of Contemporary Society cM=1.95; t (103) = -1.34, p=.182
- ③Dept. of Business Management cM=1.88; t (246) = -2.06, p=.040
- ④Dept. of Mass Communication cM=2.42; t (157) = -1.29, p=.199
- ⑤Dept. of Business & Communication cM=2.41; t (130) = -.16, p=.875

Only in the 2013 and 2014 averages for the first-term in the Dept. of Business Management (1.70 v. 1.88) was there a statistically significant difference. In all other cases, the null hypothesis was not rejected, thus, despite the averages in all departments being somewhat greater in 2014, those differences are not statistically significant.

Our research team provided a list of 135 students (28.8%) with poor and low academic performance to the Committee of School Affairs prior to the start of the second term. The Committee of School Affairs designated them as “needing guidance” (要注意) and referred them as such to their respective departments. Of the 135, 39 (28.9%) had a GPA less than 1.00, 34 (25.5%) had a GPA between 1.00 and 1.49, and 62 (45.9%) had a GPA between 1.50 and 1.99. Fig.3 provides a breakdown by department and Fig.4 for comparison shows the results for 2013.

Fig.3 Freshmen designated after the first semester in 2014 as having poor and low academic performance by dept.

2014年度入学生 1年前期終了 学科別学業パフォーマンス問題者

学科・在籍状況	学業不良	低レベル学業		単位不足	計
	0.00～0.99	1.00～1.49	1.50～1.99	GPA > 2.00*	
人間心理 96人	11 11.5%	3 3.1%	14 14.6%	3 3.1%	31 32.3%
現代社会 54人	6 11.1%	11 20.4%	5 9.3%	0 0.0%	22 40.7%
経営社会 133人	12 9.0%	13 9.8%	28 21.1%	0 0.0%	53 39.8%
マスコミュニケーション 71人	4 5.6%	4 5.6%	2 2.8%	0 0.0%	10 14.1%
情報文化 79人	4 5.1%	2 2.5%	8 10.1%	0 0.0%	14 17.7%
情報文化 35人	2 5.7%	1 2.9%	5 14.3%	0 0.0%	8 22.9%

\*取得単位数の条件を果たさない



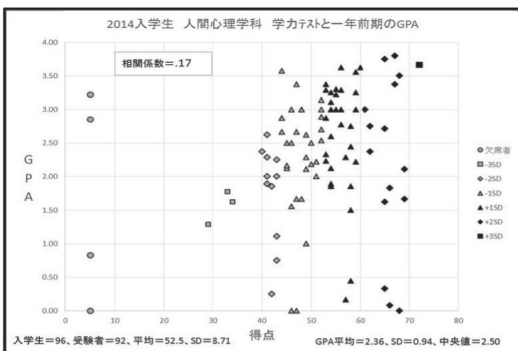
Fig.4 Freshmen designated after the first semester in 2013 as having poor and low academic performance by dept.  
2013年度入学生 1年前期終了 学科別学業パフォーマンス問題者

学科・在籍状況	学業不良			計
	0.00 ~ 1.00	1.01 ~ 1.50	1.51 ~ 2.00	
人間心理 88人 (+休学1名)	11 12.5%	12 13.6%	2 2.3%	25 28.4%
現代社会 51人	14 27.5%	4 7.8%	0 -	18 35.3%
経営社会 116人	22 19.0%	26 22.4%	1 0.9%	49 42.2%
マスコミュニケーション 88人 (+休学1名)	9 10.2%	8 9.1%	1 1.1%	18 20.5%
情報文化 53人	4 7.5%	5 9.4%	1 1.9%	10 18.9%

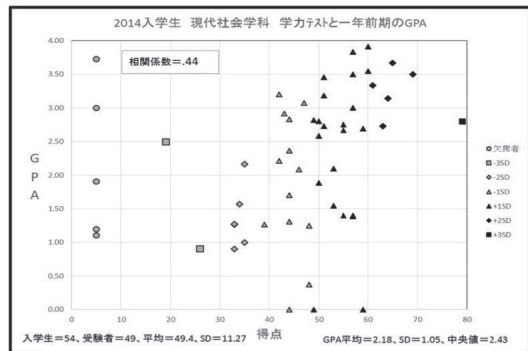
\*不可の単位数また取得単位数の条件を果たしたくない

**Results** ④Correlation of Academic Ability Test and first-term Academic Performance

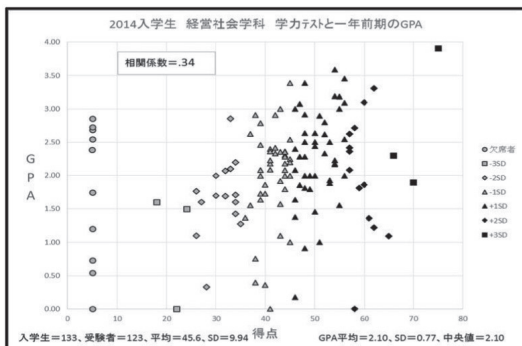
The correlation between the Academic Ability Test administered during the freshman orientation period and the Academic Performance for the first-term as measured by the student's GPA are shown by department in Graph 4.1 through Graph 4.6. The Pearson correlation coefficient for each department and basic descriptive statistics are also included. By convention, the GPAs earned by students who did not take the Academic Ability Test (未受験者) are shown on the graph between 0 and 10; this is not an indication of their academic ability nor were they considered in any correlation calculations.



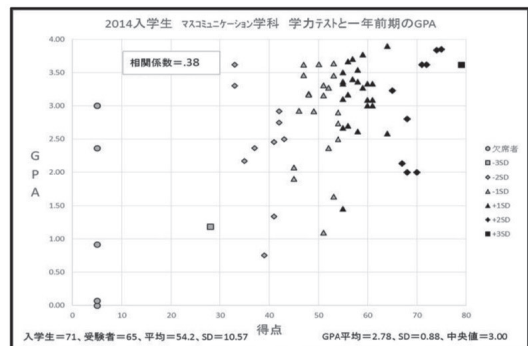
Graph 4.1 Dept. of Psychology & Humanities



Graph 4.2 Dept. of Contemporary Society

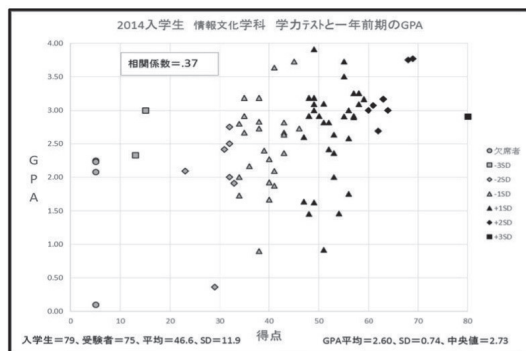


Graph 4.3 Dept. of Business Management

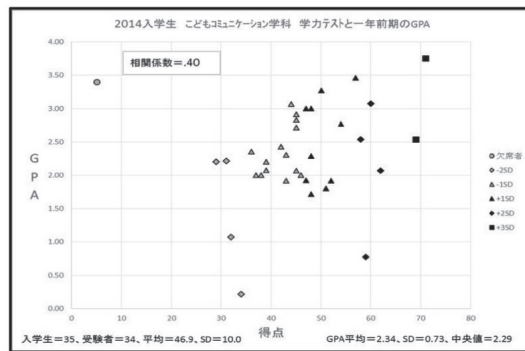


Graph 4.4 Dept. of Mass Communication





Graph 4.5 Dept. of Business & Communication



Graph 4.6 Dept. of Childhood Studies

A positive correlation exists between the scores on the Academic Ability Test and first-term GPAs. With the exception of the Dept. of Psychology & Humanities, the positive correlation is statistically significant. The results are as follows:

- ①Dept. of Psychology & Humanities  $r(92) = .17, n.s.$
- ②Dept. of Contemporary Society  $r(49) = .44, p < .05$
- ③Dept. of Business Management  $r(123) = .34, p < .05$
- ④Dept. of Mass Communication  $r(157) = .38, p < .05$
- ⑤Dept. of Business & Communication  $r(75) = .37, p < .05$
- ⑥Dept. of Childhood & Communication Studies  $r(34) = .40, p < .05.$

The lack of statistical significance in the Dept. of Psychology & Humanities is likely due to the existence of several outliers who scored in the +1SD and +2SD on the Academic Ability Test, but had GPAs of less than 0.50.

The frequencies by college (学部) of scores on the Academic Ability Test were divided into four groups by standard deviation (SD) and the GPAs were divided into two groups - GPAs equal to and above the threshold 2.00 and below 2.00. Due to the scarcity of scores in the plus and minus 3SD groups they were merged with the plus and minus 2SD groups. This 2 x 4 configuration was partitioned into six 2 x 2 chi squared tests per college (①-2SD & -1SD, ②-2SD & +1SD, ③-2SD & +2SD, ④-1SD & +1SD, ⑤-1SD & +2SD ⑥+1SD & +2SD). The frequencies and chi squared test results are shown in Fig. 5 and Fig. 6, respectively.

Fig. 5 College of Sociology observed frequencies and chi squared test results

$\chi^2$ 検定 社会学部					
学力テスト・GPAの観測度数					
	-2SD+	-1SD	1SD	2SD+	計
GPA 2.00以上	13	60	73	25	171
GPA 2.00未満	28	27	25	13	93
計	41	87	98	38	264

① -2SD & -1SD	$\chi^2(1, N=128) = 15.79, p = <.001$
② -2SD & +1SD	$\chi^2(1, N=139) = 22.43, p = <.001$
③ -2SD & +2SD	$\chi^2(1, N=79) = 9.18, p = .002$
④ -1SD & +1SD	$\chi^2(1, N=185) = 0.70, p = .404, n.s.$
⑤ -1SD & +2SD	$\chi^2(1, N=125) = 0.12, p = .726, n.s.$
⑥ +1SD & +2SD	$\chi^2(1, N=136) = 1.03, p = .310, n.s.$

Fig. 6 College of Communication observed frequencies and chi squared test results

χ <sup>2</sup> 検定 コミュニケーション学部					
学力テストの観測度数 Observed Frequencies					
	-2SD+	-1SD	1SD	2SD+	計
GPA 2.00以上	17	36	57	23	133
GPA 2.00未満	7	9	11	1	28
計	24	45	68	24	161

① -2SD & -1SD	$\chi^2(1, N=128) = 1.01, p = .315, n.s.$
② -2SD & +1SD	$\chi^2(1, N=139) = 2.28, p = .131, n.s.$
③ -2SD & +2SD	$\chi^2(1, N=79) = 5.48, p = .019, n.s.$
④ -1SD & +1SD	$\chi^2(1, N=185) = 2.62, p = .106, n.s.$
⑤ -1SD & +2SD	$\chi^2(1, N=125) = 4.02, p = .045, n.s.$
⑥ +1SD & +2SD	$\chi^2(1, N=136) = 2.32, p = .128, n.s.$

The chi squared test results show that students in the College of Sociology whose scores on the Academic Ability Test fall in the minus 2SD range or lower (see Fig.5 ①②③) are statistically more likely to get a GPA of less than 2.00 in the first-term. None of the other chi squared tests resulted in a significant statistical difference between observed and expected frequencies.

### Discussion

Why there is a noticeably higher percentage (37.4%) of earned credits for the grade of A+ in the Dept. of Mass Communication is a matter that beyond the scope of our research, but, in light of the data, it is one that merits investigation by the Committee of School Affairs. That an investigation is merited is also supported by the data shown in Graph 3.4 showing that only 3 of 11 students (27.2%) in the minus 2SD and below had GPAs less than 2.00.

The institution of a course withdrawal system (履修放棄制度) has made it imperative to monitor earned credits in addition to GPA in order to evaluate academic performance accurately. A cursory examination of the freshman withdrawal data our research team collected revealed that 105 of the 466 (22.5%) registered freshmen withdrew in the first-term from between 2 to 20 credits. Of the 105 who withdrew from a course, 74 (70.5%) withdrew from 2 to 4 credits; 23 (21.9%) withdrew from 6 to 8 credits, and the remaining 8 (7.6%) withdrew from 10 to 20 credits. Of the 105 who withdrew from a course, 52 (49.2%) had a GPA less than 2.00, while 53 (50%) had a GPA of 2.00 or higher (only 8 (7.6%) were 3.00 or above). These figures clearly show that usage of the course withdrawal system in the first-term was evenly split between students with poor or low academic performance and students with acceptable academic performance. The supposition that course withdrawal is a ploy widely employed by high academic achievers to protect their GPAs could not be supported. Lastly, as the first-term withdrawal from 83 (43%) of 193 courses are attributed to students in the Dept. of Business Management, we tentatively observe that this may well be a contributing factor to the statistically significant difference in the department's mean GPA for 2013 and 2014 (1.70 v. 1.88).

Of the 30 students who were absent for the Academic Ability Test 14 (46.7%) had a GPA of less than 2.00. Even without statistical analysis it is obvious that the probability of getting a GPA of less than

2.00 is very likely for a student in this group. Rather than allowing them to remain untested, administering the Academic Ability Test to these students at another time would help to assess their status more accurately.

The Pearson correlation calculations showed a positive correlation between the Academic Ability Test and first-term GPAs in all departments. The correlations were also determined to be significant in all departments with the exception of the Dept. of Psychology & Humanities, which was slightly below the significance threshold due to several outliers. Furthermore, the chi squared test established that students in the College of Sociology whose Academic Ability Test scores were in the minus 3SD and minus 2SD range were significantly more likely to exhibit poor or low academic performance as measure by a GPA under 2.00 or 10 or less earned credits. This suggests that this group is at risk, but it does not predict which individuals in the group are at risk. It does, nevertheless, provide early identification of a group of students upon whom early interventions (supportive measures) could be applied. What interventions and how to apply them are beyond the scope of our research, but we would recommend to the Committee of School Affairs that such a course of action is worthy of consideration.

### **Closing Remarks**

Despite the importance of the positive correlation between scores on the Academic Ability Test and first-term GPAs reported and discussed here, many other factors must be considered in order to understand poor and low academic performance. While a lot of anecdotal observation may be interesting such soft evidence is not an acceptable substitute for data-based research and statistical analysis.

It is hoped that even something as elementary as the scatterplots of the Academic Ability Test and freshman first-term academic performance provided in this report will provide an insight to faculty members who are not interested in data analysis. Distribution of students' Academic Ability Test scores and an early awareness on the part of the faculty about which students in their department are academically at risk is the first step toward early intervention.

### **Works cited**

Kelly, T.M. (2014) Identifying Poor and Low Academic Performance: Continued 江戸川大学紀要、第24号.

### **Endnotes**

- i 468 students matriculated in April 2014. Two students who failed to register for courses have been reported as 0 earned credits at a GPA of 0.00, however, they have not been counted in the calculation of the mean or median GPA calculations for their departments.
- ii Student report cards for the first term were made available to our research team in pdf format by the Administration Office (学務課). To protect student privacy this data has been kept on one portable hard disk. Outside of our project team, students' earned credits and GPAs derived from it have been made available only to the Committee of School Affairs (教務委員会) for the purpose of identifying students in need of guidance.
- iii Officially, on English transcripts the A+ used in this report would be rendered with the letter grade of S, which is the first

letter of the character 秀 read shū. (Gakusei binran 2014, p.38).

iv GPA calculations in this study use only the credits for courses which apply toward the graduation requirement of 128 total credits. This limitation should not be construed to mean that credits that do not officially count toward the graduation requirement are unimportant. The purpose of the limitation is rather to eliminate both the positive and negative impact those credits may have on a student's overall GPA and thereby provide a standard applicable to all students.