

Correlation Study Between F1 CBE Scores and Other Variables

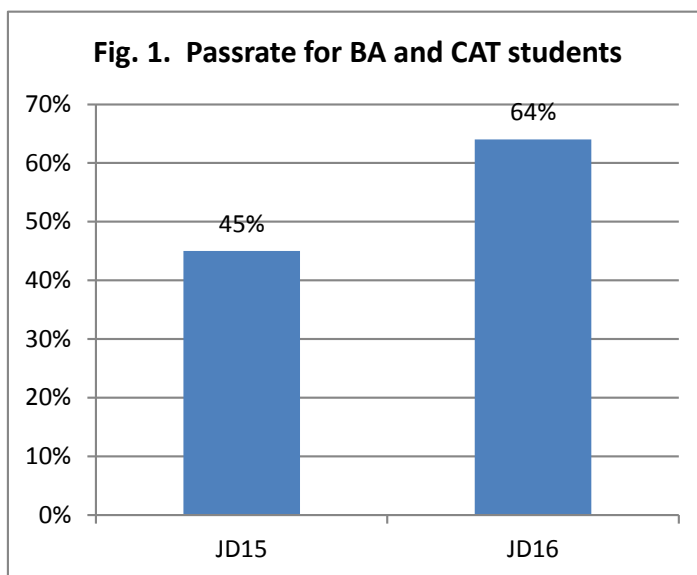
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INTRODUCTION

Paper FAB/F1 *Accountant in Business* is one of the subjects in Bachelor of Accounting & Finance (BA) in CamEd Business School taken by the students in the third year. The students also take the computer based examination (CBE) for this paper to earn international CAT qualification. In December 2015 exam, only 45% of the students passed the CBE for F1 paper.

In June to December 2016 F1 classes, the F1 lecturer thought of adding more class activities like i) reviewing all technical articles written by the F1/FAB examining team and ii) conducting extended meetings by adding two more sessions to review chapters 1 to 19 of the text book. During these review sessions, the lecturer asked the students present to sign an attendance list to record actual attendance for each session. These additional activities were not done in the preceding year. The purpose of doing these is to determine whether these will help improve the students' pass rate for F1. The result of the examinations in December 2016 shows that the pass rate for paper F1 increased from 45% in JD 2015 to 64% in JD 2016 (Figure 1).



Other factors that may have influenced the CBE scores of students other than their attendance to the review sessions were also looked into. These factors are their Aptis and math scores which were part of the admission tests of CamEd. Aptis test is an English language test package comprising writing, grammar and vocabulary used by CamEd to assess the English skills of incoming students.

RESEARCH PROBLEM

This study was done to determine the factors that may have contributed to the improvement of F1 CBE scores. Specifically, it sought to answer the following questions:

1. Is there a significant difference between the CBE scores of students who joined the extended review classes of F1 and those who did not?
2. Is there a significant relationship between the students' F1 CBE and Aptis scores?
3. Is there a significant relationship between the students' F1 CBE and Math scores?
4. Is there a significant relationship between the students' F1 CBE and midterm scores?

Statement of the Hypotheses

- H₀₁ There is no significant difference between the CBE scores of students who attended the extended review classes of F1 and those who did not.
- H₀₂ There is no significant relationship between the students' F1 CBE and Aptis scores.
- H₀₃ There is no significant relationship between the students' F1 CBE and Math scores.
- H₀₄ There is no significant relationship between the students' F1 CBE and midterm scores.

Limitation of the study

Only those students with F1 CBE scores and who have Aptis or math scores are included in this simple study. In the correlation analysis, the number (n) of students included in each variable vary as there are students with CBE score but no Aptis score or math score.

METHODOLOGY

Study subjects

This study covers only the third year students of CamEd in JD 2016 who have taken the computer based exam for paper F1. The data in Table 1 show that there were 389 students in seven groups and 267 students have taken the F1 CBE exam. Based on the data obtained from CamEd LSC, 281 students have either Aptis or IELTS score and 259 students have scores in Math test.

Table 1: Distribution of Respondents by Selected Variables

F1 Group JD 16	Total number of students	Total number of students with CBE score	Number of students with Aptis/IELTS score	Number of students with Math score
Group A	46	41	38	32
Group B	54	49	43	42
Group C	53	46	49	46
Group D	63	56	44	36
Group E	35	30	29	28
Group F	33	27	23	22
Group G (26 BA)	105	18	55	53
Total	389	267	281	259

Data Gathering and Analysis

Secondary data from LSC records were used to determine the factors that may have contributed to the improved CBE scores of F1 students in JD 2016.

The data collected were the passing rate of F1 computer-based exam, the student's individual score, their midterm exam scores, attendance sheets signed by the students during the extended two review sessions, and their Aptis and math scores.

Data Analysis

One-way analysis of variance (ANOVA) was used to test the differences in the mean scores of the three groups of students: i) those who attended 2 sessions, ii) attended one session and iii) no attendance of the review sessions.

T-test was used to determine the significant difference between the CBE scores of students who joined two review sessions and those who joined only one session. The mean scores of those who joined one review session were also compared to the mean score of those who did not join the review sessions at all.

In determining whether the Aptis, math and mid-term exam scores have significant relationship with the CBE scores, the *Pearson-Product Moment Correlation* (r) was used.

The correlation values are interpreted using the correlation values and interpretations as shown in Table 2 below:

Table 2: Correlation Values and Interpretation

High correlation	.5 to 1.0 or -0.5 to 1.0
Medium correlation	.3 to .5 or -0.3 to .5
Low correlation	.1 to .3 or -0.1 to -0.3.

Note: Adapted from <http://www.statisticshowto.com/what-is-the-pearson-correlation-coefficient/>. Copyright (2017) by [Statistics How To](#).

PRESENTATION, ANALYSIS, AND INTERPRETATION OF DATA

1. Significant difference between the CBE scores of students who joined the extended review classes of F1 and those who did not.

To test the differences in the means of the three groups: attended 2 sessions, attended one session and no attendance of the review sessions, one-way analysis of variance (ANOVA) was used.

The result shows (Table 3) that the mean CBE scores differ significantly among the three groups with $p=.000$. Hence the hypothesis (H_{01}) that there is no significant difference between the CBE scores of students who joined the extended review classes of F1 and those who did not is rejected.

Table 3: ANOVA Values for CBE vs Mean Scores of three Groups

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4518.579	2	2259.289	10.228	.000
Within Groups	53014.343	240	220.893		
Total	57532.922	242			

The significant difference between the CBE scores of students who joined two review sessions and those who joined only one session were compared using two independent samples t-test. The mean scores of those who joined one review session were also compared to the mean score of those who did not join the review sessions at all.

Table 4 shows that at $p=.018$ (2-tailed), there is statistically significant difference between the CBE means scores of those who attended 2 review sessions and those who attended only 1 session. The p-value of .047 also indicates that there is significant difference between the CBE mean scores of those students who attended only one review session and those who did not attend at all.

Table 4: Mean Scores and t-test Values between Groups

CBE scores vs review sessions attended	n	Mean score	Std. Deviation	SE Mean	T-test value	p-value
Attended 2 review sessions	161	56.13	14.87	1.172	t=2.407 (2 sessions vs 1 session)	P=.018
Attended 1 review sessions	56	50.21	16.16	2.160		
Have not attended the review sessions	26	43.16	11.40	2.236	t=2.015 (1 session vs 0 session)	P=.047

2. Significant relationship between the students' F1 CBE scores and their Aptis, Math and midterm scores

2.1 Relationship between CBE and Aptis scores

Table 5 presents the mean scores and correlations values between CBE, Aptis, Math and mid-term scores.

For the relationship between CBE and Aptis scores, the computed value $r = 0.471$ denotes a moderate positive correlation with $p\text{-value} = 0.00$. This means that the Aptis and CBE scores of the students showed a significant linear relationship with a $p\text{-value} = 0.00$. However, since r was only 0.471, this means that the coefficient of determination, r^2 , is only .2218 or 22.18%. This tells us that the linear relationship contributes only about 22% on the variation of the CBE scores.

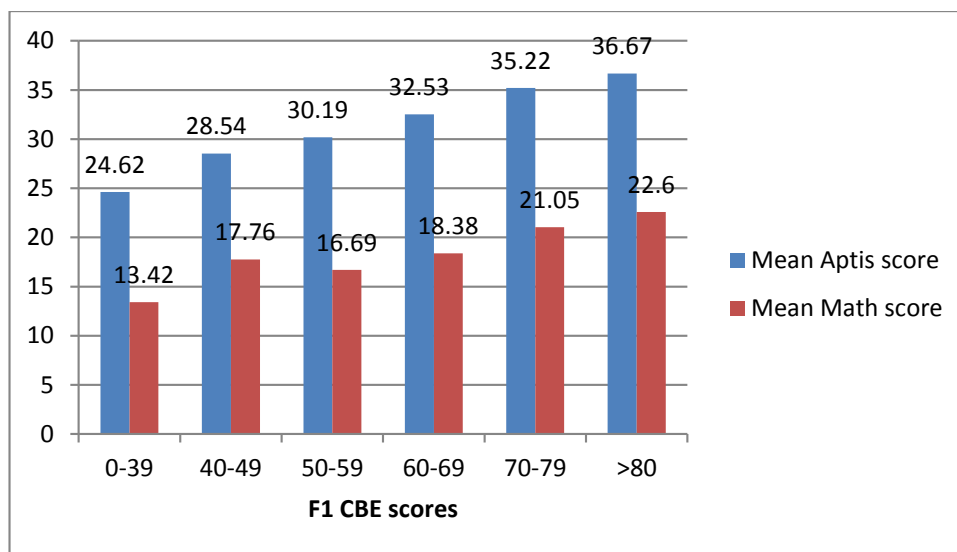
Table 5: Comparative Mean Scores and Correlation Values of Selected Variables

Variables	n	Mean	Std. Deviation	R value	p-value
CBE score	193	52.87	15.10	$r = .471$	$p = .000$
Aptis	193	29.84	7.41		
CBE score	176	51.77	15.09	$r = .402$	$p = .000$
Math	176	17.08	5.66		
CBE score	246	52.73	16.41	$r = .804$	$P = .000$
Midterm score	246	66.83	19.47		

Further analysis of the data shows that mean scores of Aptis vary as the CBE score increases. The data in Table 5 and Figure 2 present that for every 10 point increase in CBE score, there is an average increase of 2.41 in Aptis scores. Students with Aptis score of ≥ 30 may have more chances of passing the F1 computer based exam.

Table 6: Changes in Mean Aptis score for every 10 points increase in CBE Mean Scores

CBE scores	Mean Aptis	Increase in Aptis for every 10% increase in CBE score
0-39	24.62	
40-49	28.54	3.92
50-59	30.19	1.65
60-69	32.53	2.34
70-79	35.22	2.69
>80	36.67	1.45
Average increase in Aptis for every 10% increase in CBE score		2.41

Figure 2. Trends of Aptis and Math mean scores for every range of CBE scores

Relationship between CBE scores and Math scores

The F1 CBE scores of the students were compared with their scores in Math test. The computed value $r = 0.402$ implies a moderate positive correlation with $p\text{-value} = 0.00$. This means that the Math and CBE scores of the students showed a significant linear relationship with a $p\text{-value} = 0.00$. However, since r was only 0.402, this means that the coefficient of determination, r^2 , is only .1616 or 16.16%. This tells us that the linear relationship contributes only about 16% on the variation of the CBE scores. F1 paper does not involve more mathematical calculations, so probably the math score of the students may not be contributing much to their F1 CBE score.

Relationship between CBE scores and Midterm scores

The CBE scores were also compared with the midterm scores of the students. The computed value $r = .804$ indicates a high positive correlation with $p\text{-value} = 0.00$. This means that the midterm and CBE scores of the students showed a significant linear relationship with a $p\text{-value} = 0.00$. The coefficient of determination, $r^2 = .6464$ or 65% implies that the linear relationship contributes about 65% on the variation of the CBE scores. This result shows that in this group of students, those with high midterm scores are likely to pass F1 computer based exam.

CONCLUSION

The following conclusions were drawn based on the findings of this simple study:

There a significant difference between the CBE scores of students who joined the extended review classes of F1 and those who did not. Specifically, there is statistically significant difference between the CBE means scores of those who attended 2 review sessions and those who attended only 1 session and those who did not attend all the sessions. The mean CBE score of those who have not attended the review sessions is below the passing score of 50.

The Aptis and Math scores of students have moderate relationship with their F1 CBE scores. For an average increase of 2.41 in Apris scores, there is 10 point increase in the CBE score. Students with Aptis score of ≥ 30 may have more chances of passing the F1 computer based exam.

The Math scores of students also have moderate relationship with their F1 CBE scores but the linear relationship contributes only about 16% on the variation of their CBE scores.

The F1 CBE scores and midterm scores are highly correlated. This implies that those with high midterm scores are likely to pass computer based exam of paper F1.

RECOMMENDATION

This study may be replicated in a bigger group of students to determine what papers and CBE scores are highly correlated with the Aptis and Math scores. It is also good to test whether CBE scores of accounting papers are highly correlated with the students' Math score.

To improve pass rates, a cut-off score for Aptis and Math may be set for incoming students.

REFERENCE

Statistics How To (2017). What are the Possible Values for the Pearson Correlation?
Retrieved from <http://www.statisticshowto.com/what-is-the-pearson-correlation-coefficient/>