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Students' MSU-SASE/CET Scores: Their Relationship to their Grades and as Predictor on their First Take in Mathematics

Mark Premacio Laurente

Abstract – **This paper has the main purpose of determining relationships between the various fields in Mindanao State University- System Admission and Scholarship Examination (MSU-SASE)/College Entrance Test (CET) such as Language Usage, Mathematics, Science, and Abstract Reasoning and the final grades of the basic Math courses such as Math 1, Math 2, and Math 17. Respondents considered in this study were the 1st takers of the said subjects during the 1st semester A.Y. 2010-2011. This study was conducted to help improve the admission process of the students in the different academic program. It aimed to minimize the failure ratings in Math 1, Math 2, and Math 17 by active learning and formative assessment. It will serve as guide for the advisers and a student to decide which Math courses he/she is ready to enroll. This research sought to determine the relationship between the two variables with the use of *Somer's d* correlation. Furthermore, with the use of discriminant analysis, it aimed to find a model that will be used to classify/ predict future enrollees in Math whether they will likely pass or fail in Math given their scores in SASE or CET.**

Keywords – **Abstract Reasoning, Active Learning, Discriminant Analysis, Formative Assessment, Language Usage.**

I. INTRODUCTION

An entrance examination is an examination that many educational institutions use to select students for admission. These exams may be administered at any level of education, from primary to higher education, although they are more common at higher levels. Every college admission's office has objectives and needs to fulfill as they make decisions regarding admission.

Mindanao State University- Marawi Campus (commonly referred to as MSU Main) is a public coeducational institution of higher education and research university located in the Islamic City of Marawi, Philippines. Founded in 1961, it is the flagship and the largest campus of the Mindanao State University System. The school was first conceived by the 1954 Congressional Committee of the Philippines, which help create a sense of national identity especially among Muslims and Lumads. The university was founded on September 1, 1961 and opened in 1962 with 282 students and 12 faculty members on a single campus in Marawi City. The university expanded from that base to include individual campuses in Marawi City, Iligan, Naawan, General Santos, Maguindanao, Tawi-Tawi, Buug, Maigo, Karomatan, Sulu, and Lopez Jaena. Mindanao State University conducts its System Admission and Scholarship Examination (SASE) annually and a special admission exam called College Entrance Test (CET) bi-annually.

MSU annually conducts its MSU-SASE and CET to give opportunities for those who would like to pursue tertiary level in the MSU-System. It is also conducted to support and to promote its vision and mission of academic excellence and socio-economic development of the Muslims and other cultural groups in the Mindanao, Sulu, and Palawan (MINSUPALA) Regions. For a student to be admitted in MSU-Marawi, he/she should meet the cut-off score in MSU-SASE/CET, which is currently 75, thus making him/her a baccalaureate passer. On the other hand, those who obtained a General Rating of 60-74 can enroll in the College Preparatory Course (CPC). They are called Conditional students. For those who are considered to be failed, a College Bound Program (CBP) is offered every summer for Muslims and Lumads. On top of the SASE, a student can be accommodated in his/her chosen program if he/she passed a qualifying exam given by the department concerned. For example in the Mathematics Department, if a student wants to enroll in the BS Mathematics and BS Statistics program, he/she can be accommodated if he/she passes the qualifying exam. A baccalaureate passer can be exempted in the qualifying exam and accepted immediately in the said program if he/she obtained at least 60% or 24 raw score in the component of Math in the MSU-SASE/CET and his/her Math final grade in high school is at least 85%. A student who passed in the CPC program should have a grade in CPC Math of 1.5 or better. Meanwhile, a student who took and passed the CBP program should have at least 32% in final rating in CBP Math. There are other departments and colleges who will accept students in their program if they have higher score of the set cut-off score like in the case of the Accountancy Department; they only allow a student to take their qualifying exam if the said student has obtained a 90 cut-off score. Others will just be based in the cut-off score set by the University before they will allow students to take their qualifying exams.

Every baccalaureate student of MSU, regardless of course, will have to enroll in either Math 1 (Introduction to College Math), Math 2 (College Algebra) or Math 17 (College Algebra and Trigonometry) depending on which is prescribed in their respective curriculum. But it has been observed for so many years that many students failed in these mathematics courses. Thus, this study was conducted with the hope that some mitigating measures can be formulated.

The Mathematics Department, which is responsible for teaching these Math courses, revisited its departmentalized exams in the 2nd semester A.Y. 2009-2010 and until now, it is still holding its departmental exams for the basic Math courses. In connection to the study, the researcher would

like to know how the students performed in these courses and to determine whether there is a significant relationship between the SASE scores in the four subject areas (abstract, mathematical ability, language usage and science) and the final grades of the respondents who were enrolled in Math 1, Math 2, and Math 17 in the 1st semester A.Y. 2010-2011. It also would like to find a function that can be used to predict a student's performance in Math based on their SASE score. Only those who were enrolled in these subjects for the first time were considered. Retakers were not included. A study of this kind was already done by Drilon [3] but this study is conducted to see how these relationships behave with the implementation of departmental exams.

II. Related Literature

This research study emanates from the research done [16] in 2008, which focused on the performance of the students in the MSU-SASE and how it is related to the performance of the students in Math 1, Math2 and Math 17. But the study was done before the implementation of departmental exams in the Mathematics Department. According to Pacho as cited by [11], teaching and learning Mathematics is a complex process. There are some studies like [1], [2], [8] and [12] claiming that Mathematics performance in college is determined by several factors, such as student-related factors, teacher-related factors and school–related factors. A research study that was conducted by [5] recommended that the Mathematics teachers should be updated with the new trends and techniques in teaching. In his research, he stated that the Mathematics teachers should be encouraged to attend trainings and seminars related to this and they should be encouraged also to enroll and finish graduate studies in Mathematics for them to become more efficient and effective Math teachers. Another research conducted by [4], stated that Philippine Education has been the target of criticisms in view of its poor performance in Mathematics and Science. It was reported in international studies such as the Second International Mathematics Study (SIMS, 1989) and the Third International Mathematics and Science Study (TIMSS, 1997) where the Philippines was at tail-end compared to the other countries. It was supported and validated in the study of[6] where she cited the poor academic performance of secondary students and graduates, as reported by the Educational Reorientation Program of PRODED. This does not spare students' performance in Mathematics. Reference [10] also stated that pupils are consistently performing very poorly in mathematics for the past decades in the National Elementary Achievement Test (NEAT). Reference [4] stated also in her study that the predicament can be attributed to a host of factors, such as the nature of the discipline which undoubtedly is a difficult one, its concepts mostly abstract, ill-prepared teachers, lack of textbooks and instructional materials; poor lighted and ventilated and inadequately equipped classrooms and school environment; and traditional "talk and chalk" strategies in teaching, among others. She further recommended that remedial classes in English be planned, with emphasis on comprehension. English, Mathematics, and Science teachers should work in closer coordination and strive to reach a consensus on what to emphasize in teaching in order for each to integrate the topics relevant to Mathematics in their course content. In addition, this research paper has an overview on the special project paper of [9]where she used discriminant analysis was used to classify an admitted freshmen MSU-Marawi student in June 2006 into group of graduates and into a non-graduated student after four years of stay in the college.

III. Research Questions

This study aims to answer the following inquiries:

1. What is the respondents' profile in terms of gender?
2. What are the SASE/CET scores of the respondents on Language Ability, Math, Science, and Abstract Reasoning, as well as their over-all scores?
3. What are the final grades of the respondents in Math1, Math 2, and Math 17 on the first take, and what are the passing rates of these courses in the 2nd semester A.Y. 2009-2010?
4. Is there a relationship between their SASE/CET Scores in the various areas and their final grades in Math 1, Math 2, and Math 17? Can we say that the performance in the SASE/CET is a strong factor that can determine their performances in these Math courses?
5. What function or equation can be used to predict a student's passing or failure on his/her first take in Math 1? In Math 2? In Math 17?

IV. Methodology

The researcher presents in this chapter the methodology and the appropriate statistical tools that are needed in the analysis.

Sample Size

Sample size determination is choosing how many observations or replicates are to be included in a statistical sample. The sample size is an important feature of any empirical study in which the goal is to make inferences about a population from a sample. In practice, the sample size used in a study is determined based on the expense of data collection, and the need to have sufficient statistical power. The sample size used in this study is decided based on the problem about determining the passing rate of Math 1, 2, and 17. The formula found in [7] is given by

$$n = \frac{N}{1 + Ne^2}$$

where e is the amount of margin of error of the estimate of the passing rate.

Sampling Design Used

Sampling was done by considering every section of Math 1, Math 2, and Math 17. The respondent was chosen for every third interval (systematic sampling) on the class list where names are arranged in alphabetical order. In the

case where the chosen respondent is not a first taker then the next respondent in the list was chosen.

Methods of Data Gathering

Demographic profile was gathered through questionnaire and interview methods while grades and SASE/CET scores were gathered through secondary data. The researcher requested and wrote a letter to the former Vice President for Academic Affairs Emmanuel Lagare regarding the SASE Scores 2009 and CET Scores May 2010. VP Lagare sent the said SASE.CET scores via e-mail. Some respondents were interviewed by the researcher for the reliability and validity of the data gathered. Math grades are through qualitative secondary data, that is, they are taken from the "manage module" of the local server of MSU connection.

Statistical Tools

The statistical tools used to describe the characteristics of the data are mean, standard deviation and coefficient of variation and these are calculated using the following:

a. sample mean:

$$\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n}$$

b. sample standard deviation:

$$s = \sqrt{\frac{n\left(\sum_{i=1}^{n} x_i^{\,2}\right) - \left(\sum_{i=1}^{n} x_i\right)^2}{n(n-1)}}$$

c. coefficient of variation:

$$cv = \frac{s}{\bar{x}} \times 100\%$$

d. Somer's*d* Correlation Coefficient

$$d_{xy} = \frac{P - Q}{P + Q + X_0}$$

e. The Discriminant Analysis

Discriminant function analysis deals with the problem on how to separate objects into two or more group/classes given measurements for these individuals on several variables. Discriminant analysis is applicable when the dependent variable is categorical and the independent variables are continuous, ordinal, and nominal. Fisher's Linear Discriminant Function is one of the methods used in classifying the dependent variable in discriminant analysis. It deals with identifying two classifications. Let $X' = [x_1, x_2]$ be a vector of bivariate random variables and let $\mu' = [\mu_1 \mu_2]$ be the mean of the random vector, and the covariance matrix $\sum = \begin{bmatrix} \sigma_{11} & \sigma_{12} \\ \sigma_{21} & \sigma_{22} \end{bmatrix}$.

In deriving estimates, the random vector is assumed to have a multivariate normal distribution, which has the form

$$f(X_1, X_2) = \frac{1}{(2\pi)^{1/2}|\Sigma|^{1/2}} exp\left[-\frac{1}{2}(X-\mu)'\Sigma^{-1}(X-\mu)\right]$$

where $X_1 = [x_{11}, x_{12}]$ and $X_2 = [x_{21}, x_{22}]$ with mean $= \mu$ and covariance$= \Sigma$.

Fisher's linear discriminant function has its idea of transforming the multivariate observations $X = \{X_1, X_2, \cdots, X_p\}$ to *p*-univariate observations y such that *y's* derived from populations π_1 and π_2 were separated as much as possible.

An allocation rule based on Fisher's Linear Discriminant Function is as follows:

- Allocate x_0 to π_1 if $y_0 = (X-\mu)'\Sigma^{-1}x_0 \geq \hat{m} = \frac{1}{2}(X-\mu)'\Sigma^{-1}(X-\mu)$ or if $y_0 - \hat{m} \geq 0$
- Allocate x_0 to π_2 if $y_0 < \hat{m}$ or if $y_0 - \hat{m} < 0$.

V. Results and Discussion

This section contains the presentation of collected data as well as the analyses and interpretation according to the presented objectives of the study.

A. Demographic Profile of Respondents in terms of:

Table I: Distribution of Respondents According to Gender

Gender	MATH 1		MATH 2		MATH 17	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Female	320	73.6	135	74.6	217	50.3
Male	115	26.4	46	25.4	214	49.7
Total	435	100.0	181	100.0	431	100.0

Table I shows the distribution of Math 1, Math 2, and Math 17 respondents according to gender. As presented, there are 320 (73.60%) female students while 115 (26.4%) are male students enrolled in Math 1. It also shows that majority of Math 2 respondents are females since there are 135 (74.6%) female respondents out of 181 total respondents. In addition, the table above shows that there are 217 (50.3%) Math 17 female respondents and 214 (49.7%) Math 17 male respondents. Thus, female students make up the majority of the sample.

B. Performance of the Respondents in the MSU-SASE

Table II: Distribution of SASE Scores in Language Usage of the Respondents

Language Usage Scores	Raw Scores	Math 1 Respondents		Math 2 Respondents		Math 17 Respondents	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
0%-24%	0-19	58	13.3	4	2.2	12	2.8
25%-36%	20-29	96	22.1	15	8.3	49	11.4

37%-49%	30-39	164	37.7	53	29.3	111	25.8
50%-60%	40-48	90	20.7	62	34.3	136	31.6
61%-100%	49-80	27	6.2	47	26.0	123	28.5
Total		435	100.0	181	100.0	431	100.0
Mean Raw Score (% Score)		37.30 (46.63%)		36.70 (45.88%)		36.91 (46.14%)	
Standard Deviation Raw Score (% Score)		9.020 (11.28%)		8.975 (11.22%)		9.250 (11.56%)	
Coefficient of Variation		24.18%		24.46%		25.06%	

Table II shows the scores of the Math 1 respondents in the Language Usage area of the MSU-SASE/CET. Results reveal that majority or 73.1% or the students score below the passing score of 50%. The low average implies that the Math 1 respondents were not inclined in language analysis which includes grammar, comprehension, etc. In fact, the mean score is only 46.63% or 37.30 in raw score. The standard deviation of the scores is 11.28% or 9.020 in raw score and coefficient of variation of 24.18%. The results also show that most of the Math 2 respondents are said to be on their low average when it comes to English language with a mean of 45.88%. The standard deviation of 11.22% and coefficient of variation of 24.46% imply the average dispersion of the data. The table also reveals that the Math 17 respondents are not well-versed in English language since the mean value is 46.14%. The standard deviation of 11.56% and coefficient of variation of 25.06% imply that the data are moderately diverse.

Table III. Distribution of SASE Scores in Math of the Respondents

Math Scores	Raw Scores	Math 1 Respondents		Math 2 Respondents		Math 17 Respondents	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
0%-23%	0-9	8	1.8	3	1.7	1	.2
24%-37%	10-14	58	13.3	22	12.2	37	8.6
38%-49%	15-19	225	51.7	102	56.4	221	51.3
50%-60%	20-24	136	31.3	51	28.2	153	35.5
61%-100%	25-40	8	1.8	3	1.7	19	4.4
Total		435	100.0	181	100.0	431	100.0
Mean Raw Score (% Score)		17.77 (44.43%)		17.72 (44.3%)		18.91 (47.28%)	
Standard Deviation Raw Score (% Score)		3.594 (8.99%)		3.480 (8.7%)		3.283 (8.21%)	
Coefficient of Variation		20.23%		19.64%		17.36%	

In Table III, majority or 66.8% failed in the Math exam. In fact, the average score is only 44.43%. This signifies that they were not mathematically equipped with concepts and techniques in problem analysis and problem solving. It also shows that the Math 2 respondents are not inclined mathematically since most of them fall below the passing percentage score of 50% and with the evidence of the mean value which is 44.3%. The data are said to be in average consensus since it has 8.7% standard deviation and 19.64% coefficient of variation. As reflected in the table, Math 17 respondents are not well-equipped in Math and maybe this is one of the reasons why most of them failed in Math 17 on their first take. It can be proven also with the mean of 47.28%. Somehow, the data are evenly dispersed with 8.21% standard deviation and 17.36% coefficient of variation.

Table IV: Distribution of SASE Scores in Science of the Respondents

Science Scores	Raw Scores	Math 1 Respondents		Math 2 Respondents		Math 17 Respondents	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
0%-30%	0-9	50	11.5	17	9.4	14	3.2
31%-47%	10-14	123	28.3	53	29.3	92	21.3
50%-63%	15-19	139	32.0	54	29.8	132	30.6
64%-80%	20-24	66	15.2	35	19.3	97	22.5
81%-100%	25-30	57	13.1	22	12.2	96	22.3
Total		435	100.0	181	100.0	431	100.0
Mean Raw Score (% Score)		16.54 (55.13%)		16.67 (55.57%)		18.86 (62.87%)	

Standard Deviation Raw Score (% Score)	5.973 (19.91%)	5.712 (19.04%)	5.388 (17.96%)
Coefficient of Variation	36.11%	34.27%	28.57%

Reflected in Table IV is the distribution of the respondents according to their scores in Science area of the SASE/CET. Many of the Math 1 respondents or 60.2% got a passing score in Science which signifies that Math 1 students are adept with science concepts considering also that the mean score is 55.13%. The dispersion is quite higher since the standard deviation is 19.91% and the coefficient of variation is 36.11%. It is also reflected in the table above that many of the Math 2 respondents have a better knowledge in Science since many of them got a passing score as revealed by the mean score of 55.57%. The results also show that the Math 2 respondents are most likely to be inclined towards Science. The table above also tells that most of the Math 17 respondents are knowledgeable in Science since many of them got a passing score with a mean score of 62.87%. The data are said to be slightly high dispersed with a standard deviation of 17.96% and coefficient of variation of 28.57%.

Table V: Distribution of Scores in Abstract Reasoning of the Respondents

Abstract Reasoning Scores	Raw Scores	Math 1 Respondents		Math 2 Respondents		Math 17 Respondents	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
0%-30%	0-9	112	25.7	52	28.7	101	23.4
31%-47%	10-14	207	47.6	73	40.3	180	41.8
50%-63%	15-19	95	21.8	48	26.5	124	28.8
64%-100%	20-30	21	4.8	8	4.4	26	6.0
Total		435	100.0	181	100.0	431	100.0
Mean Raw Score (% Score)		12.18 (40.6%)		12.25 (40.83%)		12.78 (42.6%)	
Standard Deviation Raw Score (% Score)		3.915 (13.05%)		4.716 (15.72%)		4.233 (14.11%)	
Coefficient of Variation		32.14%		38.50%		33.12%	

Table V presents the scores of the respondents in the Abstract Reasoning area of the SASE/CET. Data clearly show that students who got 31%-47% prevailed among Math 1 respondents. Many of the Math 1 respondents are not highly deviate logically since most of them fall below 50% passing percentage. It can be proven also with the mean value of 40.6%. The standard deviation which is 13.05% and coefficient of variation which is 32.14% imply that the data is highly dispersed. It has been shown in the table that most of the Math 2 respondents are not that intellectually good in Abstract Reasoning with the proof of the mean value of 40.83%. The coefficient of variation with the value of 38.50% indicates highly dispersed of the data. It shows also that the Math 17 respondents are not highly equipped logically since their mean score is 42.6%. The standard deviation of 14.11% and coefficient of variation of 33.12% implies that the consensus of the data is highly dispersed.

Table VI: Distribution of Scores in General Rating in MSU-SASE/CET of the Respondents

SASE/CET Raw Scores	Math 1 Respondents		Math 2 Respondents		Math 17 Respondents	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
63 below	52	12.0	22	12.2	22	5.1
64-74	38	8.7	19	10.5	47	10.9
75-85	155	35.6	59	32.6	128	29.7
86-96	91	20.9	45	24.9	120	27.8
97-107	62	14.3	21	11.6	61	14.2
108-118	27	6.2	8	4.4	34	7.9
119-129	9	2.1	6	3.3	17	3.9
130-above	1	0.2	1	0.6	2	0.5
Total	435	100.0	181	100.0	431	100.0
Mean Raw Score (% Score)	83.96 (46.64%)		83.51 (46.39%)		87.90 (48.83%)	
Standard Deviation Raw Score (% Score)	16.396 (9.11%)		16.427 (9.13%)		16.042 (8.91%)	
Coefficient of Variation	19.53%		19.67%		18.25%	

As revealed in Table VI above, it can be said that majority or 56.3% of the Math 1 respondents have not reached the passing raw score of 90 or more. However, since the passing score for MSU-Marawi's baccalaureate program is 75, then it can be said that majority or 79.3% of the Math 1 students passed the MSU-SASE/CET. The other 20.7% have either undergone CBP or CPC before they have enrolled in Math 1. The table above also shows that with the 75 as a cut-off score of MSU-Marawi, we can consider that many of Math 2 respondents are on their average level with the mean score of 83.51. But considering the passing raw score of 90, majority or 55.3% of the respondents have not reached the said passing raw score. Twenty-two point seven percent (22.7%) of the respondents have undergone either CBP or CPC. The standard deviation and coefficient of variation values imply that the data are moderately dispersed. It also tells that most of the Math 17 respondents are immediately baccalaureate passers since most of them got the cut-off score of 75-above. When it comes to those who fall below the cut-off score, 16% of the total sample have undergone CBP or CPC. With the mean value of 87.90, Math 17 respondents performed well in their MSU-SASE/CET, thus, considering them highly passers. The standard deviation of 16.042 and coefficient of variation of 18.25% tell that the data are evenly dispersed.

C. The Respondents' Final Grades in Math

Table VII: Final Grades of the Respondents

Grade	MATH 1		MATH 2		MATH 17	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
1.00-2.00	51	11.7	13	7.2	31	7.2
2.25-3.00	146	33.6	58	32.0	149	34.6
5.00 and others	238	54.7	110	60.8	251	58.2
Total	435	100.0	181	100.0	431	100.0

Table VII above shows that only few or 51 respondents got a final grade between 1.00-2.00 in Math 1; 146 respondents have grades from 2.25-3.00; and 238 got failing grades. For Math 2 respondents, most of them or 60.8% got a failing grade. For Math 17 respondents, 31 respondents got a final grade between 1.00-2.00; 149 respondents got a final grade between 2.25-3.00; and 251 respondents got failing grade.

Table VIII: Classifications of Grades of the Respondents

Classifications of Grades	MATH 1		MATH 2		MATH 17	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Failed	238	54.7	110	60.8	251	58.2
Passed	197	45.3	71	39.2	180	41.8
Total	435	100.0	181	100.0	431	100.0

Table VIII above shows the distribution of the failing and passing grade of Math 1, Math 2, and Math 17 respondents. It is uniformly observed that majority of the respondents failed in their first take of these math courses.

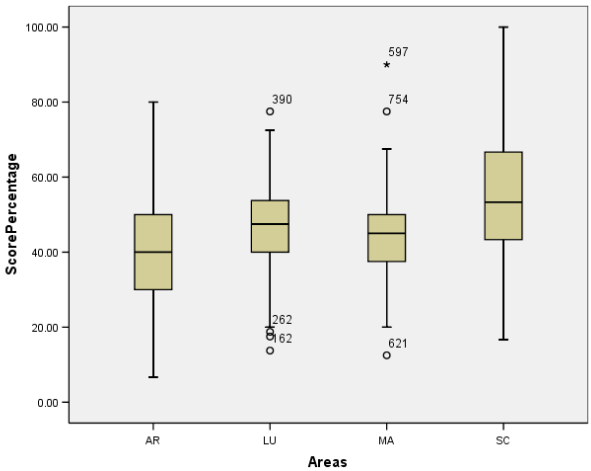

Fig.1.

Fig.1 above reveals the box plot distribution of the scores of Math 1 respondents in Language Usage, Math, Science, and Abstract Reasoning. The horizontal line in the middle of each box represents the median of the distribution which is in the percentage. The lowest median is obtained in Abstract Reasoning while the highest is in Science. The median is near to the center of the box and the length of the vertical lines (above and below the box) that extends from the box are almost of the same length which shows that the distribution of scores in each subject area is symmetric. In fact, they are bell-shaped. The length of each distribution tells about the degree of uniformity of scores in each subject area. The smaller the length connotes more uniformity of scores. It can be seen that the scores in Math and Language Usage are more uniform compared to Abstract Reasoning and Science. Thus, it can be said that there is a wider disparity in their abilities in Abstract Reasoning and Science.

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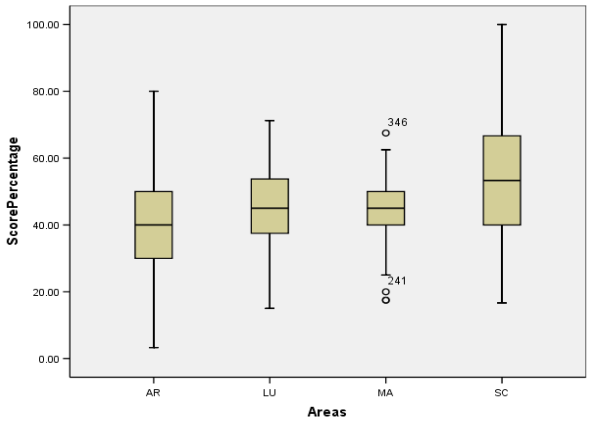

Fig.2.

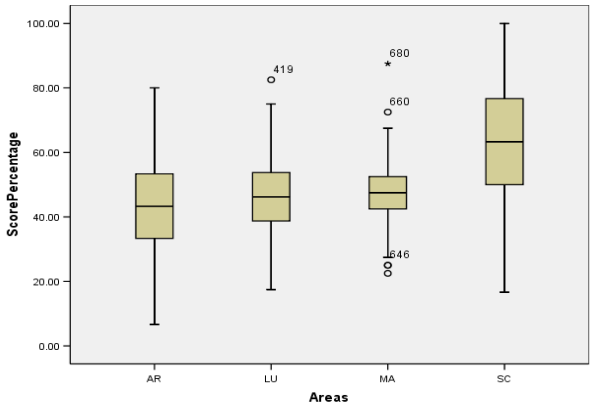

Fig.3.

Fig.2 presents the box plot distribution of the scores of Math 2 respondents in Language usage, Math, Science, and Abstract Reasoning. The lowest median is still obtained in Abstract Reasoning while the highest median is in Science. The box plot distributions are almost of the same length which shows that the distributions of scores in each subject area are symmetric. It can be observed that Abstract Reasoning and Language usage scores are more uniform compared to Math and Science which means that there is a wider disparity in their abilities in Math and Science.

Fig.3 shows the box plot distribution of the scores of Math 17 respondents in Language usage, Math, Science, and Abstract Reasoning. The highest median is obtained in Science while the lowest median is in Abstract Reasoning. The box plot distributions are almost of the same length which is symmetric just the same as that in Math 1 and Math 2 distributions. There is still a wider disparity in Math and Science and it can be said also that Abstract Reasoning and Language Usage are more uniform as the same as that in Math 2 box plot distribution.

D. Correlation between the Respondents' Scores in MSU-SASE/CET and their Math Final Grade.

This section will look into the pattern of performance in Math when the students are classified according to their scores in the subject areas in SASE/CET.

Table IX: Comparison of the Correlation between the Math 1 Respondents' Scores in their Language Usage, Math, Science, Abstract Reasoning, and their Math 1 Final Grade.

	Somer's d Value	Significance Level	Interpretation	Strength of the Correlation
Language Usage * Grade	0.253	0.000	Highly Significant	Weak
Math * Grade	0.162	0.000	Highly Significant	Weak
Science * Grade	0.391	0.000	Highly Significant	Moderate
Abstract Reasoning * Grade	0.219	0.000	Highly Significant	Weak

The very high significance level as presented in Table IX shows that $H_0$is rejected, thus it can be said that there is a significant relationship between Language Usage, Math, Science, and Abstract Reasoning Scores and the Math 1 grades of the respondents. It can be seen from the table above that the highest/strongest correlation is found between Science and Math 1 grade with a correlation coefficient of 0.391. This is followed by Abstract Reasoning and Language Usage. The weakest correlation emerged between Math ability and Math 1 grade which is quite contrary to what the researcher expected.

Table X: Comparison of the Correlation between the Math 2 Respondents' Scores in their Language Usage, Math, Science, Abstract Reasoning, and their Math 2 Final Grade.

	Somer's d Value	Significance Level	Interpretation	Strength of the Correlation
Language Usage * Grade	0.237	0.000	Highly Significant	Weak
Math * Grade	0.117	0.072	Not Significant	Weak
Science * Grade	0.333	0.000	Highly Significant	Moderate
Abstract Reasoning * Grade	0.201	0.003	Highly Significant	Weak

The very high significance level as shown in the Table X indicates thatH_0 is rejected except for correlation between Math and Math 2 Final Grade, thus it can be said that there is a significant relationship between Language Usage, Science, and Abstract Reasoning Scores and the Math 2 grades of the respondents. It can be seen from the table above that the highest/strongest correlation is found between Science and Math 2 grade with a correlation coefficient of 0.333. This is followed by Language Usage and Abstract Reasoning. The weakest correlation emerged between Math ability and Math 2 grade.

Table XI: Comparison of the Correlation between the Math 17 Respondents' Scores in their Language Usage, Math, Science, Abstract Reasoning, and their Math 17 Final Grade.

	Somer's d Value	Significance Level	Interpretation	Strength of the Correlation
Language Usage * Grade	0.135	0.001	Highly Significant	Weak
Math * Grade	0.211	0.000	Highly Significant	Weak
Science * Grade	0.383	0.000	Highly Significant	Moderate
Abstract Reasoning * Grade	0.157	0.000	Highly Significant	Weak

As prevailed in Table XI above, the very high significance level indicates that H_0 is rejected thus it can be said that there is a significant relationship between Language Usage, Math Science, and Abstract Reasoning Scores and the Math 17 respondents' Final Grade. It can be seen from the table above that the highest/strongest correlation is found between Science and Math 2 grade with a correlation coefficient of 0.383. This is followed by Math and Abstract Reasoning. The weakest correlation emerged between Language Usage ability and Math 17 final grade.

E. Discriminant Function Analysis

Aside from exploring the relationship between the SASE/CET scores and the performance in Math 1, 2 or 17, this study is also interested in finding a function that can be used to determine the likelihood of a future student in Math to pass the course in one take given information in his SASE/CET scores. This is helpful to both the students and the faculty as well as to the administration officials of the University.

Since this study is only interested to find a function that will determine whether a student would fail or pass a Math course, then the method of discriminant analysis will yield two equations, one for fail and one for pass. Whichever equation will yield a higher value when substituted with the SASE/CET scores of the students, then that would be the predicted fate of the student if he will enroll in a Math subject (Math 1, 2 or 17).

Table XII: Coefficients for the Fisher's Discriminant Functions in Math 1

	Classification of Grade in Math 1	
Subject Area	Failed	Passed
LU	.243	.245
MA	.437	.451
SC	.027	.019
AP	.062	.058
(Constant)	-18.036	-18.171

From the output in Table XII, the respective discriminant functions for passed and failed are:

Passed = 0.245 (LU) + 0.451 (MA) + 0.019 (SC) + 0.058 (AR) – 18.171

Failed = 0.243 (LU) + 0.437 (MA) + 0.027 (SC) + 0.062 (AR) – 18.036

Table XIII: Coefficients for the Fisher's Discriminant Functions in Math 2

	Classification of Grade in Math 2	
Subject Area	Failed	Passed
LU	.279	.320
MA	.501	.502
SC	.044	.040
AR	-.017	-.037
(Constant)	-18.912	-19.768

For the Math 2 respondents, the Fisher's linear discriminant functions can be estimated with the equation below when the probabilities are equal:

Passed = 0.320 (LU) + 0.502 (MA) + 0.040 (SC) – 0.037 (AR) – 19.768

Failed = 0.279 (LU) + 0.501 (MA) + 0.044 (SC) – 0.017 (AR) – 18.912

Table XIV: Coefficients for the Fisher's Discriminant Functions in Math 17

	Classification of Grade in Math 17	
Subject Area	Failed	Passed
LU	.277	.279
MA	.602	.614
SC	.079	.086
AR	-.004	-.015
(Constant)	-23.553	-24.228

The table above shows the computations of the Fisher's discriminant functions. It can be estimated with the equation below when the probabilities are equal:

Passed = 0.279(LU) + 0.614 (MA) + 0.086 (SC) –0.15 (AR) – 24.228

Failed = 0.277 (LU) + 0.602 (MA) + 0.079 (SC) –0.004 (AR) – 23.553

Table XV: Summary of the Goodness of the Model to Predict the Performance in Math

Percentage of Cases Correctly Classified by Discriminant Function	MATH 1	MATH 2	MATH 17
	54.7%	55.8%	55.7%

From the table above, if we compare the classification rate of Math 1, Math 2, and Math 17 models are compared, then Math 2 and Math 17 correct classification rates have better model compared to Math 1 correct classification rate. Thus, we can say that Math 1 correct classification rate is said to be a poor model since it has the lowest correct classification rate as compared to Math 2 and Math 17.

VI. Conclusion

It was found out that the there is a significant relationship between SASE/CET scores in various fields and the final grades of Math 1 and Math 17 respondents. Somehow, for Math 2 respondents, there is a significant relationship between SASE/CET scores in various fields except Math scores. The correlation coefficient is weak between Language Usage, Math, and Abstract Reasoning and Math 1, Math 2, and Math 17 respondents' final grades. The Science scores correlation reveals moderate correlation to all Math 1, Math 2, and Math 17 respondents' final grades, thus we can say that the respondents are might more interested in natural science.

Using the discriminant analysis, the Math 1 model correctly classified 54.7% of the Math 1 respondents and 45.3% are misclassified. For Math 2 equation, 55.8% of the respondents are correctly classified and 44.2% are misclassified. For Math 17 function, 55.7% of the respondents are correctly classified and 44.3% are misclassified. If the classification rates of the discriminant models of Math 1, Math 2, and Math 17 are compared, it can be concluded that Math 2 has a better discriminant model since it has a greater classification rate as compared to Math 1 and Math 17.

Despite the link between I.Q. and academic achievement, there are many other factors that contribute to success in school. These include the motivation to succeed, physical and mental health, and social skills (Sternberg, 2003 and 2006).

SASE/CET results can help teachers' group students who function roughly the same level in subject areas such as Math or Reading so they can be taught the same concepts together. SASE results should be used in conjunction with other information about an individual.

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Author's Profile

Mark P. Laurente

is an educator, mathematician and statistician. He graduated his Bachelor of Science in Mathematics from the Mindanao State University, Marawi City, Philippines. He also finished his Master of Science in Mathematics and Certificate in Statistics from the same institution. He is also a passer of August 2007 Licensure Examination for Teachers (LET) and April 2010 Civil Service Examination. He is currently pursuing his Doctor of Philosophy in Mathematics in Iligan Institute of Technology of the Mindanao State University, Iligan City, Philippines. His research interests include mathematics education, teacher education, graph theory, statistics, and algebra.