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ASSESSMENT ON THE USE OF BRIDGING PROGRAM FOR SENIOR HIGH SCHOOL STUDENTS

ROBERT L. CASTRO

Office of the Director for Academic Affairs, ACLC College of Butuan, Butuan City, Philippines

Abstract: **Bridging Program in Mathematics (BPM) is a program implemented by ACLC College of Butuan which aim is to give basic mathematical assistance for those Senior High School students who fail in the Diagnostic test given to them during the entrance examination. These students' lack of basic knowledge in mathematics may lead to their failure in General Mathematics and Statistics and Probability, and will forfeit their subsidy from the government, commonly known as the Voucher Program. If these students lose their government's subsidy, it may be difficult for them to finish their studies within two (2) years.Students with low score in mathematics during the admission examination are obliged to take the BPM. The BPM is a well-structured, coordinated program with a clear goal of increasing student's mathematical performance. The Bridging Program utilized the learning theories namely, Cognitive – Gestalt Approaches and Facilitation theory (the humanist approach). The BPM is a semester long program, which is offered during the first semester of grade 11. The Bridging Program will be enrolled as a regular subject having 4 units with 4 contact hours per week. Students will take the program together with the regularly offered subject. The effect of the program will be measured through the grades of the students in mathematics subject in the second semester that will be compared to the grades of students in the same mathematics subject who passed the diagnostic test or students who have not undergone the Bridging Program.**
Result shows that there is a significant difference between the academic performance in General Mathematics and Statistics and Probability of students with and without BPM, and the academic performance of students can be predicted by the following model:

$$\boldsymbol{Academic\ Performance\ in\ General\ Mathematics} = 85.685 + 2.608(\boldsymbol{Program\ Enrolment\ Status}) - 1.842(\boldsymbol{Sex}) - 2.446(\boldsymbol{Type\ of\ JHS})$$

$$\boldsymbol{Academic\ Performance\ in\ Statistics\ and\ Probability} = 84.733 + 1.231(\boldsymbol{Program\ Enrolment\ Status}) - 1.526(\boldsymbol{Sex})$$

The Bridging Program in Mathematics is in its 2nd year of implementation, and its first year's assessment is very satisfactory. The program's aim was not just met but surpassed the expectation of the school; it leaves a positive effect in the academic performance of students with Bridging Program in General Mathematics and Statistics and Probability.

Keywords: **Bridging Program in Mathematics (BPM), Diagnostic test in Mathematics, Program Enrolment Status (PES).**

1. INTRODUCTION

ACLC College of Butuan, a private HEI known for producing Business and Information Technology professionals in the Caraga Region, launched a new program in 2016, the Senior High School Program, which help and support the Department of Education (DepEd) cater the high number of students who would enroll in its first year of implementation.

The ACLC educators thoroughly reviewed the curriculum of the said program, and concluded that the level of difficulty of some of the disciplines is quite high. Hence, the school had the initiative to offer a "Bridging Program in Mathematics" because mathematics is considered as one of the most difficult subjects under the Senior High School Curriculum.

The BPM is implemented by ACLC College Butuan is anchored on two theories of learning namely, Cognitive – Gestalt Approaches and Facilitation theory (the humanist approach) by Max Wertheimer and Carl Rogers respectively.

According to Burns, R. (1995), in the adult learning at work business, Cognitive – Gestalt Approach emphasizes the importance of experience, meaning, problem-solving and the development of insights. Similarly, the BPM of ACLC College of Butuan gives importance to actual learning and to the development of insights, and mastery of concepts through practice. Hence, the concept of worksheets, problem-solving, and repetitive process is being utilized in the said Bridging Program.

Also, the bridging program builds its concept through the Facilitation Theory (the humanist approach) developed by Carl Rogers, et al. The basic premise of this theory is that learning will occur with the educator acting as a facilitator, that is, by establishing an atmosphere in which learners feel comfortable to consider new ideas and are not threatened by external factors (Laird, D. 1985).

Further, this theory characterized the belief that human beings have a natural eagerness to learn. Through this characterization of human being, the bridging program capitalized in the natural eagerness of the students to learn and understand the concept of mathematics.

Also, the facilitation theory encouraged learners to take responsibility for their own learning. Similarly, the program builds students accountability and responsibility in learning, hence making students more focused and more involved in the learning process.

The primary goal ACLC College of Butuan's BPM is to improve the mathematical performance of students who got low scores in mathematics during the senior high school admission examination. The result of the senior high school admission examination revealed that numerous examinees lack the mathematical fluidity. This implies that those with low score in mathematics do not have the necessary competencies in mathematics for the senior high school. This gap creates a bigger problem as a student may not be able to pass the senior high school mathematics subject. This problem may result to bigger problems such as failing grades, dropping out or delayed graduation. Hence, ACLC college of Butuan took the initiative to address the problem at its early stage through the conduct of a Bridging Program.

Bridging program is similar to a tutorial session, but the scheme is almost the same with a regular subject in the Senior High School (SHS) curriculum that has four (4) units with four (4) hours of class in a week. The students who were part of the said Bridging Program were identified through the results of the entrance examination (diagnostic test). Thus, if a student failed to reach the passing score in mathematics, he/she will undergo the said program.

As the new Philippine Basic Education Curriculum is implemented, there have been a lot of concerns about the level of competencies to be taken and how difficult they can be. The Department of Education (DepEd) is not prohibiting the Higher Education Institutions (HEI) on their initiatives to effectively implement the K-12 curriculum as long as the basic competencies required and embedded in the curriculum are well-delivered. For many, mathematics is a very difficult subject; and that is one of the considerations that the ACLC administrators thought of in crafting the Bridging Program with the goal of helping the student gain further learning on the basic concepts of mathematics.

The Department of Education is quite strict in requiring all schools nationwide, public or private, to at least avoid failing the students in their subjects, considering that the Senior High School (SHS) students who enrolled in private institutions are under the government's subsidy program called "The Voucher Program". One of the conditions of this program is that a student should maintain a passing grade in all of the learning areas. Many of ACLC Senior High School (SHS) students do not even have enough background in Calculus and other higher mathematics, so the school has anticipated that if there will be no bridging program, there will be a lot of students who would fail in the said discipline, and as a consequence, forfeit their government's subsidy.

To this end, this study seeks to assess the effectiveness of the Bridging Program in Mathematics of ACLC College of Butuan by looking into the academic performance in General Mathematics and Statistics and Probability, of students who have undergone the said program by comparing the same with the performance of those who passed the Diagnostic Test in Mathematics through the following objectives:

a. to determine the demographic profile of the students including their type of Junior High School last attended;

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b. to determine whether there is a significant difference between the academic performance of the students with and without Bridging Program in Mathematics (BPM) in General Mathematics and Statistics and Probability; and

c. to determine the significant factors that predict the academic performance of the students in General Mathematics and Statistics and Probability.

2. RESEARCH PARADIGM

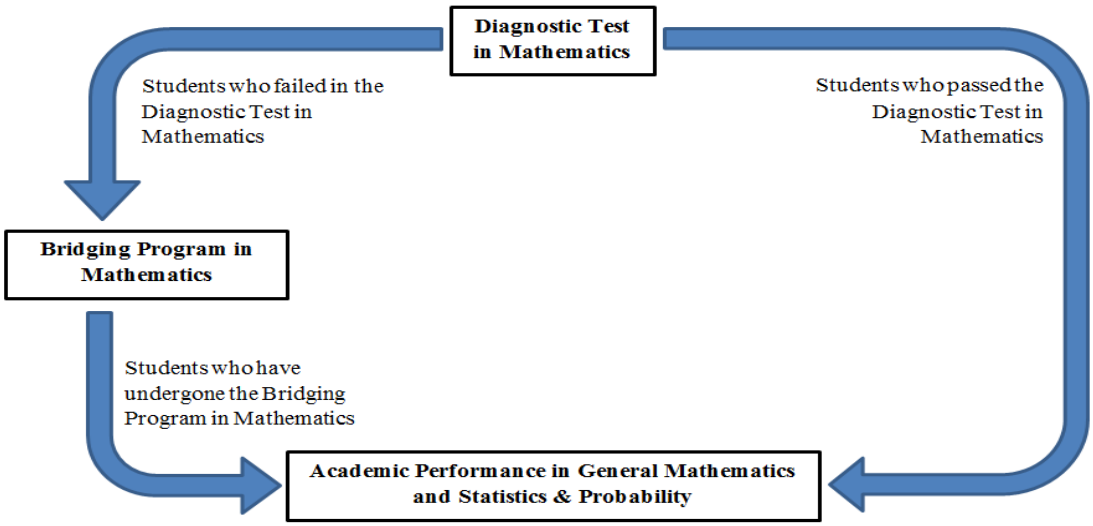

Figure 1: The flow chart of the study

3. RESEARCH DESIGN AND METHODS

This study is descriptive-quantitative type of research and utilize student's grades in mathematics subjects during the first (General Mathematics) and second semester (Statistics & Probability) which are continuous data, specifically ratio level of measurement.

The data to be gathered are the grades of all Grade 11 students in Mathematics in the first and second semester (General Mathematics and Statistics & Probability respectively). The respondents will be categorized as Students under Bridging Program in Mathematics, and Students who passed the Diagnostic Test in Mathematics. The grades have gone through an Academic Council Meeting (ACM) to ensure its validity and reliability.

Mann-Whitney U Test was also used to determine if there is a significant difference in the academic performance in Mathematics of students with and without Bridging Program since the distribution of data is not normally distributed.

In determining factors that significantly affect the student's performance in mathematics, Multiple Linear Regression was used. Multiple linear regression attempts to model the relationship between two or more explanatory variables and a response variable by fitting a linear equation to observed data. Every value of the independent variable x is associated with a value of the dependent variable y.

4. RESULTS AND DISCUSSIONS

1. What is the demographic profile of the students in terms of:

a. Sex;

Table 1: The table shows a distribution of participants in terms of their sex.

	Male	Female	Total
With BPM	84	94	178
Without BPM	28	26	54
Total	112	120	**232**

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It is shown that there are 112 male participants and 120 female participants.

b. Age; and

Table 2: The table shows a distribution of participants in terms of their age group.

	15 y.o	16 y.o	17 y.o	18 y.o	19 y.o	20 y.o	21 y.o	Total
With BPM	28	81	56	7	3	3	0	178
Without BPM	7	22	18	4	1	1	1	54
Total	35	103	74	11	4	4	1	**232**

It is shown that 16 years old age group has the highest number of participants with 103 students, while 21 years old age group has the least number of participants with 1 student.

c. Type of Junior High School attended (Private or Public)?

Table 3: The table shows a distribution of participants in terms of their type of Junior High School last attended.

	Public	Private	Total
With BPM	168	10	178
Without BPM	51	3	54
Total	219	13	**232**

It is shown that there are 219 participants that come from public schools, and only 13 participants from private schools.

2. What is the academic performance of students with and without Bridging Program in Mathematics in terms of:

a. Sex;

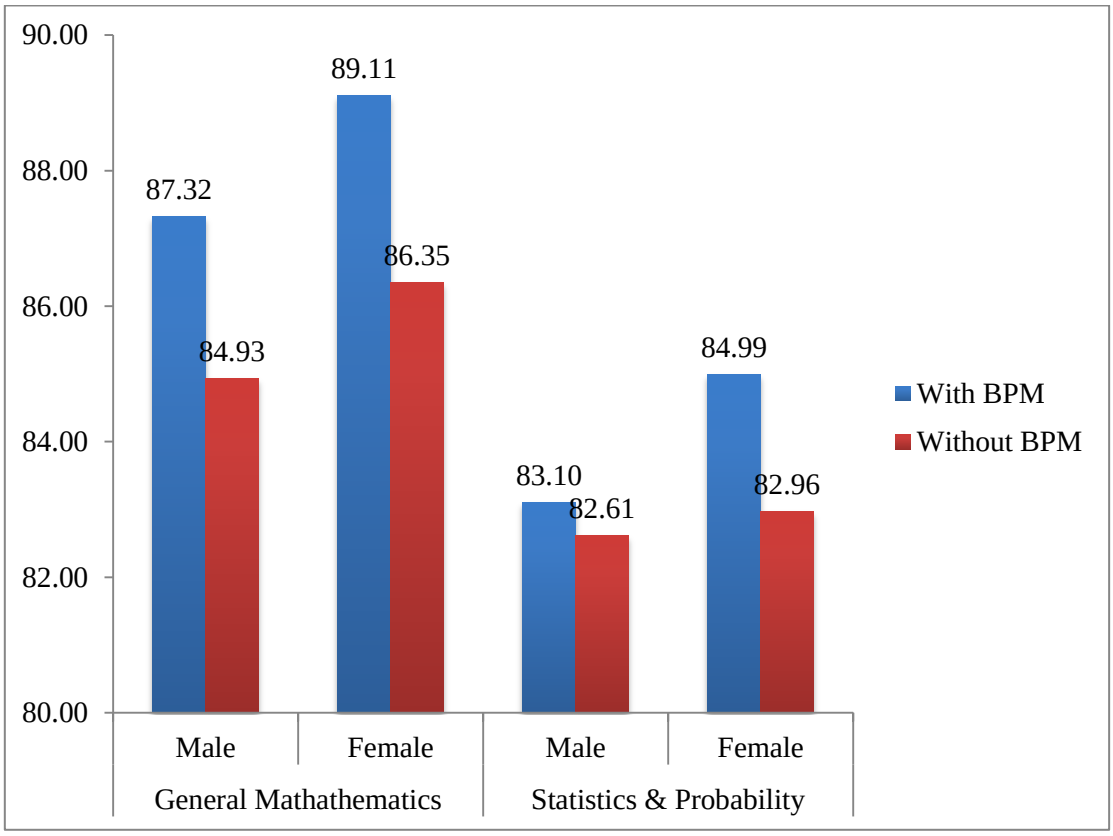

Figure 2: Participants' academic performance in General Mathematics and Statistics and Probability in terms of their sex.

The figure shows a comparison of the average of the grades of the respondents in General Mathematics and Statistics and Probability in terms of their sex. It is visible that both male and female participants with BP perform better in both General Mathematics and Statistics and Probability than those without BP.

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b. Age;

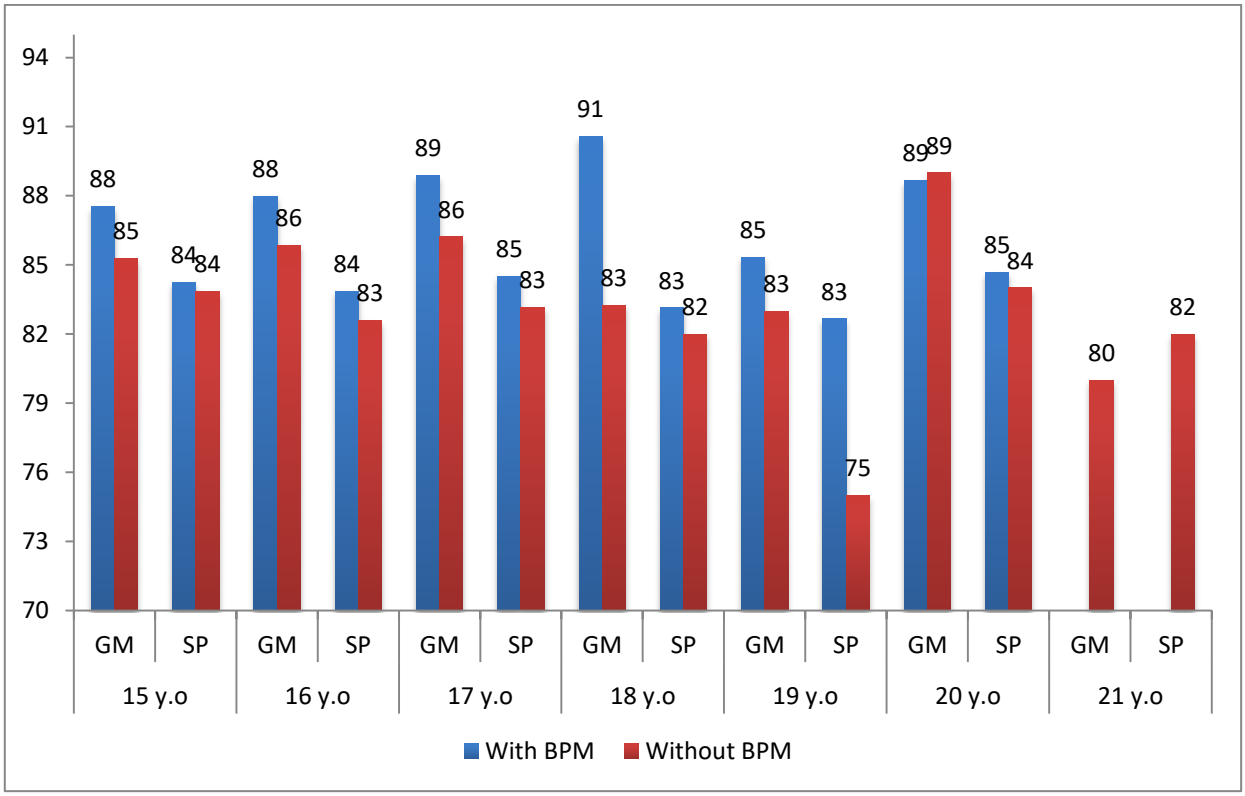

Figure 3: Participants' academic performance in General Mathematics and Statistics and Probability in terms of their age group.

The figure shows a comparison of the average of the grades of the respondents in General Mathematics and Statistics and Probability in terms of their age group. Participants with BPM perform better in General Mathematics and Statistics and Probability than those without BPM in age groups 15, 16, 17, 18, and 19. In age group 20, student without BP performs quite better in General Mathematics than those with BPM with 0.33 points difference. In the same age group, students with BP perform better in Statistics and Probability than those without BPM with 0.67 points difference in their average. In the 21 years old age group, there are no participants with BP while there is only one (1) participant without BP with 80 and 82 average in General Mathematics and Statistics and Probability respectively.

c. Type of Junior High School attended (Private or Public)

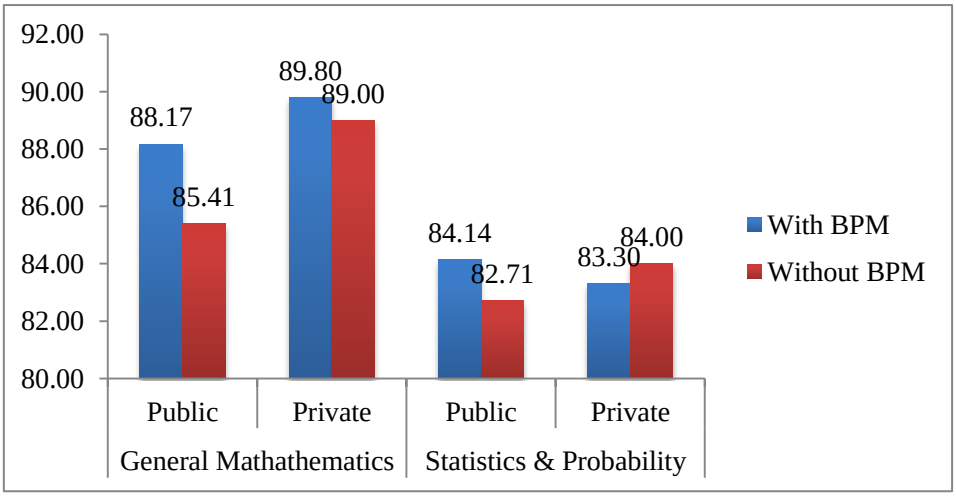

Figure 4: Participants' academic performance in General Mathematics and Statistics and Probability in terms of their type of Junior High School last attended.

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The figure shows a comparison of the average of the grades of the respondents in General Mathematics and Statistics and Probability in terms of their type of Junior High School last attended. It is visible that participants which come from private schools with and without BP perform better in General Mathematics than those who come from public schools. Participants with BP which come from public schools perform better in Statistics and Probability than those who come from private schools. Participants without BP which come from private schools perform better in Statistics and Probability than those who come from public schools.

3. Is there a significant difference between the academic performance of students with and without BPM in:

a. General Mathematics (first semester); and

Null Hypothesis	Test Statistic	p-value	Decision
There is no significant difference between the academic performance (in General Mathematics) of students with and without BPM.	Independent-Samples Mann-Whitney U Test	0.000	Since p-value is less than 0.05, we reject the Null Hypothesis.

The significance level is .05

Based on the average of the grades of participants in General Mathematics with and without BP, participants with BP perform better than those without BP with 2.58 points difference. It supports the theory of Cognitive – Gestalt Approaches and Facilitation theory (the humanist approach) by Max Wertheimer and Carl Rogers respectively, in which the learners performs better in General Mathematics through practicing its basic skills before engaging in higher problems and applications in General Mathematics.

b. Statistics and Probability (second semester).

Null Hypothesis	Test Statistic	p-value	Decision
There is no significant difference between the academic performance (in Statistics and Probability) of students with and without BPM.	Independent-Samples Mann-Whitney U Test	0.018	Since p-value is less than 0.05, we reject the Null Hypothesis.

The significance level is .05

Based on the average of the grades of participants in Statistics and Probability with and without BPM, participants with BPM perform better than those without BPM with 1.26 points difference. It supports the theory of Cognitive – Gestalt Approaches and Facilitation theory (the humanist approach) by Max Wertheimer and Carl Rogers respectively, in which the learners performs better in Statistics and Probability through practicing its basic skills before engaging in higher problems and applications in Statistics and Probability.

4. What factors significantly predict the student's performance in :

a. General Mathematics; and

Null Hypothesis		Unstandardized Coefficients	Sig.	Decision
	(Constant)	85.685	.000	
Program Enrolment Status does not predict academic performance in General Mathematics	Program Enrolment Status	2.608	.000	Reject Null Hypothesis
Student's sex does not predict academic performance in General Mathematics	Student's Sex	-1.842	.000	Reject Null Hypothesis
Student's age does not predict academic performance in General Mathematics	Student's Age	.193	.411	Failed to Reject Null Hypothesis
Type of JHS does not predict academic performance in General Mathematics	Student's type of Junior High School last attended	-2.446	.019	Reject Null Hypothesis

a. Dependent Variable: Academic Performance in General Mathematics

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Result shows the unstandardized coefficients of the factors that may predict student's performance in General Mathematics. The unstandardized coefficient tells us the number of units a student's academic performance in General Mathematics changes for a single unit of change in each predictor. Students' age does not predict academic performance in General Mathematics. Thus, we can predict student's academic performance in General Mathematics using the model:

$$\boldsymbol{Academic\ Performance\ in\ General\ Mathematics} = \mathbf{85.685} + \mathbf{2.608}(\boldsymbol{Program\ Enrolment\ Status}) - \mathbf{1.842}(\boldsymbol{Sex}) - \mathbf{2.446}(\boldsymbol{Type\ of\ JHS})$$

b. Statistics and Probability

Null Hypothesis		Unstandardized Coefficients	Sig.	Decision
	(Constant)	84.733	.000	
Program Enrolment Status does not predict academic performance in Statistics and Probability.	Program Enrolment Status	1.231	.044	Reject Null Hypothesis
Student's sex does not predict academic performance in Statistics and Probability.	Student's Sex	-1.526	.003	Reject Null Hypothesis
Student's age does not predict academic performance in Statistics and Probability.	Student's Age	-.070	.783	Failed to Reject Null Hypothesis
Type of JHS does not predict academic performance in Statistics and Probability.	Student's type of Junior High School last attended	-.005	.996	Failed to Reject Null Hypothesis

a. Dependent Variable: Academic Performance in Statistics and Probability

Result shows the unstandardized coefficients of the factors that may predict student's performance in Statistics and Probability. The unstandardized coefficient tells us the number of units a student's academic performance in Statistics and Probability changes for a single unit of change in each predictor. Students' age and type of JHS last attended does not predict academic performance in Statistics and Probability. Thus, we can predict student's academic performance in Statistics and Probability using the model:

$$\boldsymbol{Academic\ Performance\ in\ Statistics\ and\ Probability} = \mathbf{84.733} + \mathbf{1.231}(\boldsymbol{Program\ Enrolment\ Status}) - \mathbf{1.526}(\boldsymbol{Sex})$$

5. CONCLUSIONS

After testing the significant difference between the academic performance in General Mathematics and Statistics and Probability, the following conclusions were drawn:

1. There is a significant difference between the academic performance (in General Mathematics) of students with and without BPM. Based on the average of the grades of participants in General Mathematics with and without BP, participants with BP perform better than those without BPM with 2.58 points difference.

2. There is a significant difference between the academic performance (in Statistics and Probability) of students with and without BPM. Based on the average of the grades of participants in Statistics and Probability with and without BP, participants with BP perform better than those without BPM with 1.26 points difference.

Both results support the theory of Cognitive – Gestalt Approaches and Facilitation theory (the humanist approach) by Max Wertheimer and Carl Rogers respectively, in which the learners performs better in General Mathematics And Statistics and Probability through practicing its basic skills before engaging in higher problems and applications in General Mathematics and Statistics and Probability.

After determining the significant factors that may predict academic performance in General Mathematics and Statistics and Probability, the following conclusions were drawn:

1. Students' age does not predict academic performance in General Mathematics. Thus, we can predict student's academic performance in General Mathematics using the model:

$$\textbf{\textit{Academic Performance in General Mathematics}} = 85.685 + 2.608(\textbf{\textit{Program Enrolment Status}}) - 1.842(\textbf{\textit{Sex}}) - 2.446(\textbf{\textit{Type of JHS}})$$

2. . Students' age and type of JHS last attended does not predict academic performance in Statistics and Probability. Thus, we can predict student's academic performance in Statistics and Probability using the model:

$$\textbf{\textit{Academic Performance in Statistics and Probability}} = 84.733 + 1.231(\textbf{\textit{Program Enrolment Status}}) - 1.526(\textbf{\textit{Sex}})$$

REFERENCES

[1] Brooks, J (1995). Training and Development Competence: a practical guide Kogan Page, London.

[2] Burns, R. (1995). The adult learner at work Business and Professional Publishing, Sydney.

[3] Burns, S. (1995). 'Rapid changes require enhancement of adult learning' HRMonthly June, pp 16-17.

[4] Knowles, M.S. (1978). The Adult Learner: a Neglected Species 2nd edition, Houston: Gulf Publishing Company, Book Division.

[5] Knowles, M.S. (1990). The Adult Learner: a Neglected Species 4th edition, Houston: Gulf Publishing Company, Book Division

[6] Laird, D. (1985). Approaches to training and development Addison-Wesley, Reading, Mass.

[7] McGill, I & Beaty, L (1995). Action Learning, second edition: a guide for professional, management and educational development Kogan Page, London.

[8] Pogson, P. & Tennant, M. (1995). 'Understanding Adults' in Foley, G. ed. Understanding adult education and training, St Leonards, Allen & Unwin, pp.20-30.

[9] CIIT College of Arts and Technology (2018). 2018 Review and Updates on the K-12 Curriculum in the Philippines. Retrieved from http://www.ciit.edu.ph/k-12-curriculum-in-the-philippines/

[10] Department of Education (2018). K to 12 Basic Education Curriculum. Retrieved from http://www.deped.gov.ph/k-to-12/curriculum-guides/Core-SHS

[11] Barnett, Raymond, et.al. (2008). Precalculus (7th ed). NY, USA: McGraw-Hill Education.

[12] Clarke, Jonathan, Tomas Jandik, and Gershon Mandelker (2001). "The Efficient Markets Hypothesis," Expert Financial Planning: Advice from Industry Leaders pp. 126-141.

[13] Crauder, Bruce; Benny Evans; & Alan Noell (2008). Functions and change: A modeling approach to college algebra and trigonometry. Boston: Houghton Mifflin.

[14] De Laplante, K. (2013). What is a good argument? The truth condition.

[15] Schulz, K. (2015). The really big one. Retrieved from http://www.newyorker.com/magazine/2015/07/20/the.

[16] Stewart, J., Redlin, L., & Watson, S. (2012). Precalculus: Mathematics for calculus (6th ed). Belmont, CA: Brooks/Cole, Cengage Learning.

[17] Waner, Chris & Steven R. Costenoble (2001). Supplementary Chapters to Accompany Finite Mathematics, 2nd ed. CA: Brooks/Cole.Young, Cynthia Y. College algebra (3rd ed). Hoboken, NJ: John Wiley & Sons, 2012.

[18] Albert, J. R. G. (2008). Basic Statistics for the Tertiary Level (ed. Roberto Padua, WelfredoPatungan, Nelia Marquez), published by Rex Bookstore.