Academic Performance of Senior High School Students in Pre-Calculus

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Introduction. Knowledge in Pre-Calculus depends on students' understanding of Algebra and Trigonometry. The result of the Program for International Students Assessment (PISA) in 2018 disclosed that the Philippines ranked the second-lowest in Mathematics assessment and indicated low performance in advanced subjects such as Calculus. Hence, the paper described the level of academic performance of senior high school students in a maritime school in Bacolod City during the school year 2019-2020. Likewise, it aimed to determine the relationship between the students' demographics and the level of academic performance in Pre-Calculus. Furthermore, it is intended to test the correlation and predictive capability of the school of origin and entrance examination scores in the academic performance of students in Pre-Calculus.

Methods. A descriptive-correlational research design was used to assess and correlate academic performance in Pre-Calculus of senior high school students in a maritime school in Bacolod City during the School Year 2019-2020. The restructured topics in Pre-Calculus were angles and triangles, trigonometric functions of acute angles, right triangles, and oblique triangles. The data was gathered using a researcher-made instrument, as reflected in the school's table of specifications prepared by the mathematics teachers, which had undergone validity tests, item analysis, and reliability testing. Mean, Standard Deviation, and Pearson r were used to analyze the data.

Results. The findings of the study revealed that the level of academic performance in Pre-Calculus of senior high school students was generally average regardless of their school of origin and entrance examination scores. In accordance with their school of origin, students academically performed high in angles and triangles while low in areas of right triangles and average in other areas. Furthermore, in terms of their entrance examination scores, students got very high academic performance in the area of angles and triangles and average in other areas. In terms of the relationship between demographics and the level of academic performance in Pre-Calculus, the findings revealed no significant relationship between school of origin and academic performance. On the other hand, a significant relationship was found between entrance examination scores and academic performance. Finally, the findings revealed that entrance examination scores significantly predict academic performance in Pre-Calculus.

Conclusion. The remedial teaching plan on the least mastered skills in Pre-Calculus is essential in developing students' academic performance in the subject. The school administrator may ensure that the restructured topics would be successful through a follow-up assessment test in Pre-Calculus and monitor that every student who is at risk of failing the subject should be given a program to cope up with the competencies expected of them in order to have globally competitive graduates able to perform tasks expected of them in their future careers. It further showed that students who got higher entrance examination scores would gain high academic performance in Pre-Calculus. It implies that mathematics teachers may take initiative action to increase performance in the areas where students find difficult and explore differentiated instructions and innovative instructional materials to relieve the students' common misconceptions or errors in the topics. Also, the Department of Education (DepEd) Curriculum planners may consider restructuring the curriculum of the Science and Technology, Engineering, and Mathematics (STEM) under the Pre-Baccalaureate Maritime

Specialization Strand to prepare the students with quality education and to prepare them to be globally competitive in their chosen career.

Practical Value of the Paper. The study significantly contributes to the few existing literature on the academic performance in Pre-Calculus of senior high school maritime students. Furthermore, the findings of the study can be considered as a baseline in reflecting the current status of academic performance, which will eventually help in mastering skills and applying them in higher mathematical and practical applications in life.

References

Aji, C. A., & Khan, M. J. (2019). The Impact of Active Learning on Students' Academic Performance. *Open Journal of Social Sciences*, *07*(03), 204–211. https://doi.org/10.4236/jss.2019.73017

Aminudin, M., Nusantara, T., Parta, I. N., Rahardjo, S., As'ari, A. R., & Subanji. (2019). Engaging problems on trigonometry: why were students hard to think critically? *Journal of Physics: Conference Series*, *1188*, 012038. https://doi.org/10.1088/1742-6596/1188/1/012038

Aryüce, T., & Turgut, M. (2018). From Congruent Angles to Congruent Triangles: The Role of Dragging, Grid, and Angle Tools of a Dynamic Geometry System. Osmangazi Journal of Educational Research ISSN-2651-4206 | Eskisehir Osmangazi University. - Google Zoeken, 2018

Bressoud, D. M. (2017). The Role of Calculus in the Transition from High School to College Mathematics. Mathematical Association of America and National Council of Teachers of Mathematics. - Google Zoeken, 2017

Babaali, P., & Gonzalez, L. (2015). A quantitative analysis of the relationship between an online homework system and student achievement in pre-calculus. *International Journal of Mathematical Education in Science and Technology*, *46*(5), 687–699. https://doi.org/10.1080/0020739x.2014.997318

Daines, J., Troka, T., & Santiago, J. (2018). Improving performance in trigonometry and pre-calculus by incorporating adaptive learning technology into blended models on campus. *2016 ASEE Annual Conference & Exposition Proceedings*.

Ernaningsih, Z., & Wicasari, B. (2017). *Analysis of mathematical representation, communication, and connection in trigonometry [Conference session]*. *International Conference on Research in Education*, Sanata Dharma University.

Estonanto, A. (2017, December). *Math anxiety and academic performance in pre- Calculus of selected senior high school in Sorsogon State College*. Home: Northwest Mindanao State College of Science and Technology.

Fabito, B. S., Rodriguez, R. L., & Catacutan-Bangit, A. E. (2015.). *Correlation between student entrance exam results and academic performance: Case of a College in a Philippine University*. National University – Education that works.

Febrilia, B. R. A., & Winarti, D. W. (2018). Deepening students understanding of triangle topic through 'application' component of ELPSA (Experience, Language, Pictorial, Symbol, and Application) framework. *Journal of Physics: Conference Series*, *1088*, 012085. https://doi.org/10.1088/1742-6596/1088/1/012085

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