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Predictors of Physics Performance at Marhs

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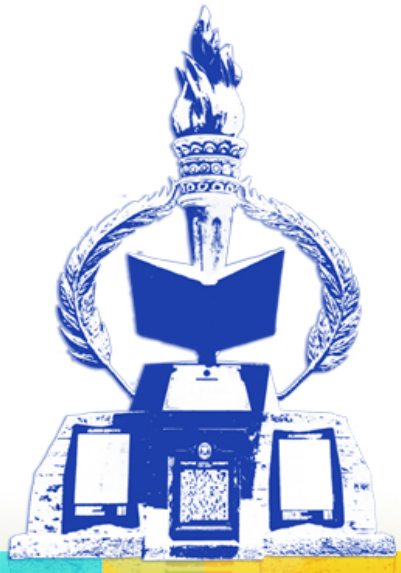

PREDICTORS OF PHYSICS PERFORMANCE AT MARHS

BY
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Manila
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PREDICTORS OF PHYSICS PERFORMANCE AT MARHS

A Special Project
Presented to
the Faculty of the College of Science
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In Partial Fulfilment
of the Requirements for the Degree
Master of Education in Teaching Physics

Meriam A. Walican
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APPROVAL SHEET

This special project entitled "**PREDICTORS OF PHYSICS PERFORMANCE AT MARHS"** prepared and submitted by **MERIAM A. WALICAN** in partial fulfilment of the requirements for the degree of **Master of Education in Teaching Physics**, is hereby recommended for approval and acceptance.

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Dedication

This work is dedicated to my dearest husband and my loving children.

Each one of you is my inspiration.

Without you in my life and I could not have achieved this milestone.

We all did it!

Abstract

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Title: Predictors of Physics Performance at MARHS

Key Concepts: predictors of performance, performance in physics

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The aims of this study is to determine which among the predictors greatly influence the academic performance in physics of students of MARHS. This study is limited to the identification of the correlates and predictors of the performance of physics students in MARHS-SHS. Taken as respondents in this study, were 100 Senior High School students who had regular subject loads in the academic year 2017- 2018. A total of five (5) independent variables- English, Mathematics, Science, GPA, and General Scholastic Aptitude were considered in this study. The data were classified on the basis of the research design and the problem formulated. To generate an appropriate analysis, the different descriptive statistical measures: minimum, maximum, arithmetic mean, and standard deviation were used. To show the relationship between the academic performance in physics and the predictive variable, the Pearson's product moment coefficient of correlation (*r*) was employed. The result indicated that a typical SHS student at MARHS has an above average performance in GSA, GPA, & SCI

Achievement, but average performance in ENG and MATH. The students had average physics performance. There is no significant relationship between sex and physics performance and the significant predictors of physics performance are ENG11, MATH11, and GSA. At least these three predictors could predict whether the student will obtain a greater performance in physics at MARHS. In view of the results drawn, it is recommended to create proper student's profiling based on English achievement, Mathematics achievement, Science achievement, GPA achievement, and Scholastic Achievement to give a special attention to identify students who need enrichment in preparation for collegiate studies. Provide continuous monitoring on the students' performance in physics and enhance the integration of Physics principles in English, and Mathematics subjects to provide opportunities for the students to gain and hone the skills and concepts required for the course.

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Chapter I

The Problem and Literature Review

Introduction

The most significant assets for any education institution are the student, for without students schools have no value. The academic performance of students is directly proportional to the academic and social development of the country. Thus, in creating a compose and consequently responsible leaders and manpower of a country, students' academic performance plays an important role (Ali et al. 2010)

The important element of selection is predicting the future performance. According to Romer, Grob, and Volker as cited by Amjad and Qureshi (2011), previous academic base and achievement significantly influence academic performance. Anderson as cited by Fortugaliza (2016) corroborated that past performance predicts and influence future academic performance. Considine and Zappala (2012), in the same study, stated a clear proposition that the school and immediate community should synergistically function to arrive at a favourable result. The identification of valid and practical academic performance is a predictors needed in the development of selection mechanisms in an institution like Manuel A. Roxas High School (MARHS) which plays a vital role for active participation in the knowledge societies, where they give their students deep insight of specific subject knowledge and provide the social norms of communication and interaction. The behaviour and achievement of each student is influenced by a wide range of interacting factors which make a significant contribution to the prediction of eventual performance in academic area.

The scholastic standing of a student at a given moment is denoted as academic performance. It is the ability of the students to demonstrate his/her intellectual abilities. It enables the students to study and remember facts, communicate knowledge orally and in written form even under examination conditions. The foundation for the further education of student is played crucially by secondary education. Students can better cope with the challenges of life and profession with great ease if at the secondary school level a good foundation is laid (Kpolovie et al. 2014). The school obtained in a subject or group of subject taken can be explained by their scholastic records (Asaolu 2013 and Daniel 2011). Thus, in the prediction of academic performance, Daniel in the study of J. N. Edokpayi, et al (2011) suggested and reported that the use of grades could serve as prediction and criterion measures and future examination result is a prediction and foundation that could be made with reasonable success on the basis of the results of a prior examination.

In the past, people believed that academic ability was a genetic phenomenon that was more or less predetermined; therefore, all that children needed to do to succeed was to be dedicated to the task of learning. Fortunately, research has concluded that numerous factors, intrinsic, as well as extrinsic can predict and even influence a student's academic achievement (Asikhia, 2013). Yet, there are conflicting ideas on which specific factor or factors have the greatest influence on academic performance.

Once a valid set of predictors is recognized it can be used for a different purpose, depending on how sophisticated and useful the information to any school. Identifying predictors may be useful in directing students in the choice of subjects that they undertake and used for

identifying students who may have problems in making grades on such that remedial action may be taken.

Consequently, this paper focuses on predictors of physics performance and reserves most of the attention on the extent and impact of students' motivating variables in their performance that reveal the effectiveness of physics in MARHS in terms of academic achievements which results to positive and better instruction. The hope of providing them the information would somehow lead the school to consider the issue.

Background of the Study

Physics has always presented a great challenge to many students. Many students would agree that one of the most difficult subjects studied in school is Physics. Multitudinous students find it difficult to even define Physics, let alone master the artfulness of all formulas made up of strange looking symbols (Modini, 2016). It also has seen a large share of subject failures. In fact, performance each semester ranges from proven mastery of the material down to complete misunderstanding of basic concepts. What tends to discourage a student from studying physics is the general lack of understanding of what physics is subject's inherited difficulty and reliance on mathematics (Awodun, 2013).

As Zamora (2013) articulated, "Having taught in private schools for several years, I have come to recognize that laboratory resources, textbook for each student and an academically qualified physics teacher may not always amount to high achievement in physics. My students have the materials they need, the comfortable air-conditioned classrooms, library resources and internet access, and yet they still perform poorly in physics" (p.3).

Naturally, the school is interested in understanding any possible predictors for success in its core courses so that it can both section students by ability as well as understand common student weaknesses. In order to make a good judgment about the future of education and to make known whether the students receive a successful education, the students are assessed by educators. As Popham (2011) in the study of Tugan (2014) stated, "Education is a decision-making enterprise, and educational measurement helps educators make better decisions"(p. 34).

For this reason, the study has been directed on how certain aspects are needed by the students to meet the condition for academic success. According to Almaraz et al. (2010), Ning and Downing (2010) stated that there is no one method that can be implemented or used to improved student's success but several studies have made it possible to consider different pathways. These studies have demonstrated that Academic Skills, Communication, Mathematics, and Predictors of Success can be accounted antecedents for academic success of the students.

To decide what predicts success in a specific field of science is a more basic area of research that is increasingly significant. Students now are typically expected to become scientifically literate citizens who are able to understand the scientific issue especially nowadays (Glynn and Brickman, 2009). They should also be able to solve the basic real world problems using scientific principles (Smith, Gould, & Jones, 2014). As the students' increases in number, identifying variables that predict success becomes more important for retaining students in the sciences (Aud et al. 2010).

It may be mentioned that the findings of this study is expected to provide insight on the extent and impact of students' motivating variables in their performance. It is also aimed to reveal the effectiveness of physics in school in terms of academic performance which results to

positive and better instruction. Its significance, therefore, will not be in line with the learning achievement of the students but also along with administration, supervision, and management of instruction in MARHS community.

Literature Review

A broad range of related literature and studies by the researcher reveals that there is a dearth of research materials closely related to the present studies. This chapter contains a summary of reviewed materials which helped the researcher in conceptualizing the problem of the study.

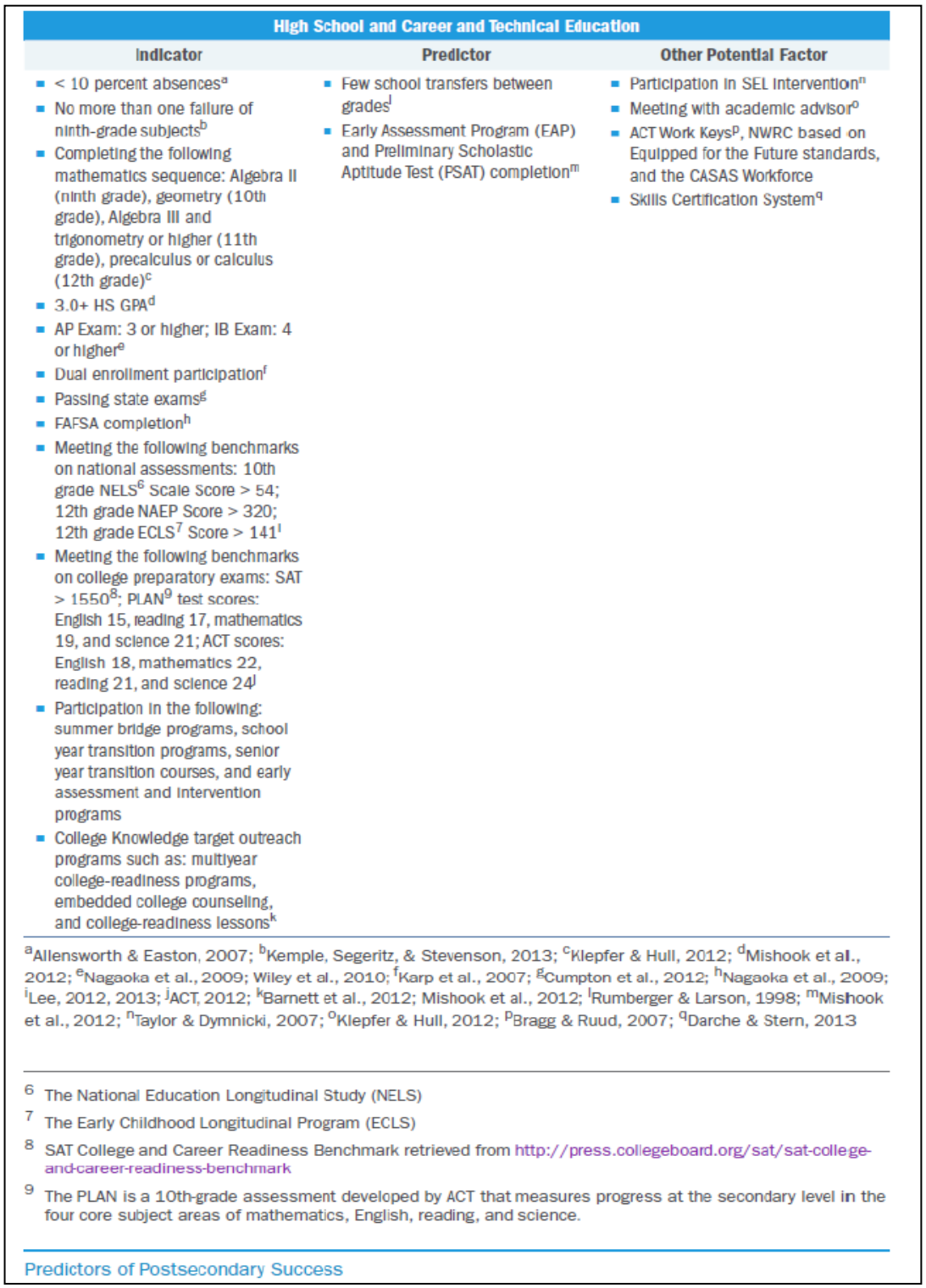
Defining Academic Performance

Contemporary psychological and educational movements define academic performance differently. Hein and Smerdon (2013) of College & Career Readiness & Success Center at American Institutes for Research describe factors at different levels of education that predict future academic performance and economic security. They included a wide range of standards of future success and presented their findings using three categories: 1) indicators, 2) predictors, and 3) other potential factors. They used the following definitions:

> "***Indicators*** are measures with an established threshold. Students that perform at or on top of the edge (e.g. students who earn a 3.0 grade point average [GPA)] or higher) are more likely to be prepared for their college and academic pursuits.
>
> ***Predictors*** are processes that are extremely correlated with improved post-secondary outcomes except for that a numeric threshold has not been established.
>
> ***Other potential factors*** are skills and attributes that are known as vital to students' success and are driven by sound theoretical arguments (e.g. collaborative skills are significant for future success) except for that reliable metrics haven't nevertheless been developed or tested severally of different factors" (p. 12).

Figure 1 shows that attendance, GPA, and test scores are the most frequently noted indicators.

Figure 1. Correlates of Secondary & Post-Secondary Success in High School



High School and Career and Technical Education

Indicator	Predictor	Other Potential Factor
▪ < 10 percent absences[a]	▪ Few school transfers between grades[l]	▪ Participation in SEL intervention[n]
▪ No more than one failure of ninth-grade subjects[b]	▪ Early Assessment Program (EAP) and Preliminary Scholastic Aptitude Test (PSAT) completion[m]	▪ Meeting with academic advisor[o]
▪ Completing the following mathematics sequence: Algebra II (ninth grade), geometry (10th grade), Algebra III and trigonometry or higher (11th grade), precalculus or calculus (12th grade)[c]		▪ ACT Work Keys[p], NWRC based on Equipped for the Future standards, and the CASAS Workforce
▪ 3.0+ HS GPA[d]		▪ Skills Certification System[q]
▪ AP Exam: 3 or higher; IB Exam: 4 or higher[e]		
▪ Dual enrollment participation[f]		
▪ Passing state exams[g]		
▪ FAFSA completion[h]		
▪ Meeting the following benchmarks on national assessments: 10th grade NELS[6] Scale Score > 54; 12th grade NAEP Score > 320; 12th grade ECLS[7] Score > 141[i]		
▪ Meeting the following benchmarks on college preparatory exams: SAT > 1550[8]; PLAN[9] test scores: English 15, reading 17, mathematics 19, and science 21; ACT scores: English 18, mathematics 22, reading 21, and science 24[j]		
▪ Participation in the following: summer bridge programs, school year transition programs, senior year transition courses, and early assessment and intervention programs		
▪ College Knowledge target outreach programs such as: multiyear college-readiness programs, embedded college counseling, and college-readiness lessons[k]		

[a]Allensworth & Easton, 2007; [b]Kemple, Segeritz, & Stevenson, 2013; [c]Klepfer & Hull, 2012; [d]Mishook et al., 2012; [e]Nagaoka et al., 2009; Wiley et al., 2010; [f]Karp et al., 2007; [g]Cumpton et al., 2012; [h]Nagaoka et al., 2009; [i]Lee, 2012, 2013; [j]ACT, 2012; [k]Barnett et al., 2012; Mishook et al., 2012; [l]Rumberger & Larson, 1998; [m]Mishook et al., 2012; [n]Taylor & Dymnicki, 2007; [o]Klepfer & Hull, 2012; [p]Bragg & Ruud, 2007; [q]Darche & Stern, 2013

6 The National Education Longitudinal Study (NELS)

7 The Early Childhood Longitudinal Program (ECLS)

8 SAT College and Career Readiness Benchmark retrieved from http://press.collegeboard.org/sat/sat-college-and-career-readiness-benchmark

9 The PLAN is a 10th-grade assessment developed by ACT that measures progress at the secondary level in the four core subject areas of mathematics, English, reading, and science.

Predictors of Postsecondary Success

The communicative, mathematical, science, social science, thinking skills and competencies are the academic actions that make a students to succeed in school and society as defined by the Institute of Education Science of the Department of Education (2015) and being administered by the Center of Research of Education Diversity and Excellence.

Asikhia (2013) presented a relatively large body of research in the predicting academic performance of students. This was focused on two types of predictors: cognitive and non-cognitive. The cognitive factors are the ability or traditional measures and usually refer to as the high school grades and standardized test scores while non-cognitive is effective on non-academic factors. The effectiveness of cognitive predictors of student performance has been well illustrated. Larson and Scortino as cited in Asikhia (2013) found that high school grades and standardized test scores had consistently high correlation with four- year college performance.

Lansangan et al. (2015) demonstrated that Scholastic Aptitude Test (SAT) scores and high school grades for academic achievement in college have high predictive power; however when other variable are included in the study, the predictive validity of standardized test and high school grades tends to be negligible. As reported by Schalk, (2015), SAT and grades in high school have shown to have moderate predictive validity for first year GPA in school especially when other variables were included in the model.

In the present study, English Achievement (ENG), Mathematics Achievement (MATH), Science Achievement (SCI), Grade Point Average (GPA), and Scholastic Aptitude (GSA) are the indices used as the traditional predictors of student academic performance.

The scholastic standing of a student at a given moment is described as the academic performance in physics. It is how the student is able to demonstrate his/her intellectual abilities.

The grades obtained in a course or group of courses taken can be explained by the scholastic standing (J.N.Edokpayi, et al. 2011).

According to Martha (2015), examination performance which is characterized by performance in tests, course work and examination of undergraduate student is a description of academic performance. Balabat et al. (2016) observed that the most significant determinants of students performance is a measurement of his/her prior educational performance. It would mean accomplishment and ability acquired as a result of quality instruction rendered by the teachers. Achievement or performance is adequate and valid if it provides evidence of the extent to which the students have attained major objectives of the unit of instruction.

Franken and Cottrell (as cited in Zamora, 2013) defined achievement as an accomplishment. "Achievement tests are given to measure the extent of learning that has taken place as a result of exposure to a relatively defined learning experience" (p. 16). These test drive students to perform better and to become experts in a subject. Morkhtar and Syafena (as cited in Gideon, 2012) defined academic performance as the degree to which a student is accomplishing his or her tasks and studies. According to them, grade point average (GPA), cumulative grade point average (CGPA) and test results are the several ways to determine student's academic performance. Hornby in the study of Nizoloman, (2013) cited achievement as the end product of learning experience, which is what students have gained as a result of what they have learned.

In this study, the achievement or performance refers to the final grade of the student in physics. Numerous factors that affect academic performance in various centers of learning have been carried out to identify and analyze a number of studies. The improvement of the academic performance of students lies in the need to adopt corrective measures especially in public funded

institutions. The current global economic situation which demands that government boosts financial efficiency resource allocation and utilization found public-funded institution under scrutiny.

Study regarding determinants of academic performance among educators, policy makers, academics, and different stakeholders is mostly acceded the impact that these determinants correspond with context and program of study. Since not all factors are useful for a particular context, it is essential that conventional studies be carried out to identify the context specific determinants for well decision making. This review of literature apportions a substantial probe of the factors that impact academic performance. The selection of factors analyzed here was based on their significance to the current study.

English as a Factor of Physics Performance

"Expressing one's opinions, hope, and dream can be help by knowing your Language" (Abidin, Pour-Mohammadi, and Alzwari 2012, p. 170). Educators agree that the basis for success is academic pursuit is having a proficiency in English Language. The tasks are based on language skills which include reading, writing, and working with numbers (Racca and Lasaten, 2016). They view this as the interplay between everyday language and more advanced communication. Language proficiency is a key to academic performance. One may not have access to the world's known scientific and technological discoveries that are predominantly written in English if a person does not know English as discovered by Fakeye and Ogunsiji.

Javier (2014) claimed that the students' efficiency in English can result to the students' weakness in Science and Technology. As stated in his findings, the students' difficulty in

English included difficulties in making decisions and interpretations of information, deducing meaning, drawing conclusions, and summarizing ideas. All these boil down to problem on comprehension. The student does not understand what they are reading. Thereby, have difficulty in expressing their ideas in spoken and written form.

Mirabueno (2014) discussed the significance of the English language in learning. He stated that we communicate through the use of oral, verbal or written language. In his study, McLaughlin, Shepard, and O'day (1995) stated that the content standard and its benchmark should extend performance standard and they quote, "how good is good enough" in learning outcomes. Concrete examples and explicit definition of what students know and are able to do to demonstrate and manifest proficiency in the skills, knowledge, and understanding formed by the content standard that is Performance!

Mallick (2012) in his article, mentioned that science is a periodical subject and it is significant for its learners to be able to express their views and ideas in a clear and appealing form. For this purpose it is necessary that they should have thorough knowledge of the language that they use. A student who does not have a good command of the language cannot express his/her views and various scientific laws and principle in front of others. Capps and Pickreign (1993) added that students should be able to communicate adequately and meaningful through the use of language provided in Mathematics and Science.

Young (2015) cited that in learning mathematics and science it is very important to have a mastery of the language of instruction. Students who have difficulty in communication skills may likely do not do well academically.

Aina et al. (2013), clear out to the educational system that English language is very crucial. It is not only the language of textbook but also the medium of instruction at the upper primary, secondary, and tertiary level of education. Student assesses knowledge in other subject area through the vehicle of English language.

Daller and Phelan, in the study of Martirosyan, et al. (2015) corroborated that foreign students from non-English speaking background and temporarily reside the country for the purpose of getting a degree would take even longer to obtain academic skills in the second language, and their restricted language skills may well be one in all the determinants directly or indirectly influencing their academic success. Hence, their language proficiency might be the key factor in their academic success.

Gunderson,in the study of Olanipekun, et al. (2014) stated that good language proficiency is a positive predictive validity variable on the performance of students.

Bettinger, Evans, and Pope (2012) conducted a study using the date of all graduates from public four-year universities in Ohio in 1999. The data was diverse because it was gathered from different sizes of schools and from students of various age, gender and race. Based on the study, it was found that English scores from ACT had a strong relation of predicting the first year college GPAs.

Aina, et al. as well as Bailey and Butler, in the study of Mirabueno (2014) opposed that academic language proficiency is a requirement to academic success. Villacortes (2010) cited that non-readers are a perennial problem in the educational system. Teachers must be aware of this because teachers are the central figures in all teaching activities.

Dooney and Oliver, in the study of Wilson, et al. (2012) did study on the predictive validity of IELTS test as an indicator of future academic success. The study aimed at a predictor of performance and success of science and engineering school by investigating how accurate IELTS. They found out that the relationship between language proficiency and academic achievement has no significant correlation.

Wilson and Komba, (2012) investigated in Tanzanian secondary school the relationship between English language proficiency and academic performance. The study disclosed a weak positive relationship between English language proficiency and academic achievement of students.

According to Wongtrirat, (2012), the International students in US institutions of higher education reported 22 meta-analysis studies on the relationship between English language proficiency and academic achievement. Based on the results of the meta- analysis, it was revealed that students' actual academic difficulty was not significantly associated with the TOEFL scores as measurement of English proficiency.

Kao and Thompson, in the study of Ardacheva (2010) categorized student's achievement into two broad categories: cultural orientation and structural position theories. Cultural orientation describes the groups' differences toward schooling and its main cause is to promote and hinders achievement. Structural position theories define differences in academic performance to the cultural group's socio economic position and experiences. The study emphasized that sociology and educational research directly consider that "Learning a new language is a development process and it requires a gradual accumulation of skills over time" (p. 114).

The significance of English language for enhancing educational attainment through improved communication skills can never be over emphasized. To function effectively not only in English language but also in other subjects, students need not find difficulty with their communication skills in English language. When students' proficiency is high, academic performance of the students will definitely be affected and improved. Student accesses knowledge in other subject areas through the vehicle of English language. This study defines English achievement as the arithmetic average of all final ratings obtained by students on English.

Mathematics as a Factor of Physics Performance

Physics and other natural sciences have an old age relationship with Mathematics. It is the foundation of science and technology. Its functional role is multifarious (Muhammad et al. 2014)

Yeo Kee Jiar cited Chorin and Wright, in the study of Awodun, (2013) stated that mathematics is an essential component of a science, serves as a universal language and all important source of intellectual tools. Hence, it is called as the gate and key to sciences.

"Without arithmetic, there is no science, and without science there is no modern technology and without modern technology there is no modern society". This describes the importance of and contribution of mathematics to modern culture of science and technology. It is indispensable in the modern societal development.

Herbert, in the study of Muhammad et al. (2014) viewed mathematics as the "Queen and Servant" of science. The mathematical techniques and measurement approaches are significant in

the physics society. Physicist uses the mathematical devices to give clear picture of the relationship between different variable.

Barnes, in the same study articulated that "All sciences depend on investigations and all investigations depend on measurements and measurement is a branch of mathematics." The competence in mathematics is an important part in the study of physics according to most of the investigators in sciences.

The vital role which mathematics plays in education is derived from interdisciplinary values which the subject seeks to inculcate in the learners. It is a major tool for the understanding and application of science and technology. It trains the mind on attention and concentration which are bound to be useful for the students throughout life. It stimulates the practice of accuracy, logic, systematic and orderly arrangement (Nizoloman, 2013).

Yeo Kee Jiar in the study of Awodun (2013) corroborated that to be excellent in Physics, a student should be excellent in Mathematics as well. This finding is in agreement with that of Hogan in the study of Muhammad (2014) who correlates students' performance in technical drawing, mechanical engineering technology, electrical engineering design and electric power and machines to mathematics. Also, the findings of Udom of the same study described that achievement in mathematics can be the basis of predicting success in Physics.

Awodun (2013) revealed that the skills of the students are relevant towards the determination of the dependent measure.

Liu (2018) stated that in the historical views Physics and Mathematics have a strong interrelationship. Yeo Kee Jiar viewed that in direction making and problem solving, Physics curriculum and mathematics have a similar aims and emphasized skills.

Research data were extracted from 2009, 2010, 2011 and 2012 WAEC examination results from three secondary schools in Birnin Kebbi local government area of Kebbi state. Simple linear correlation regression analysis is used to test the null hypothesis using a descriptive survey design. There was an indicated moderate to weak correlation from the R values of 0.384, 0.104, 0.022, and 1.58 for the 0.158 for the year 2009, 2010, 2011 and 2012 respectively. F- ratio was applied to the results to test the significance. The null hypothesis was accepted since the calculated values of F were less the critical values of F= .62 at 5 % level of significant.

In the study of Bello and Ariyo (2014) revealed that high Mathematical competence in the secondary school is not sufficient for high performance in introductory Physics at university level. This implies that secondary school Mathematics cannot sufficiently predict undergraduate students' performance in physics.

In my scientific degree, mathematical competency is an integral component (Koenig et al, 2012). Belward et al. (2011), stressed out that the area of outmost attention is the context of science is the ability to apply mathematical and statistical thinking. An inability to demonstrate fundamental quantitative skills at the school level stymies deep learning, contributes to student attrition, and may have dire implications (Thompson et al. (2012) as cited in Hine and Anderson, 2015). In this study mathematics achievement is defined as the arithmetic average of all final ratings obtained by students on mathematics.

Science as a Factor of Physics Performance

Science has become an essential tool for a developed or developing country that aim to progress in the socio economic state and will help establish its learning in school. In this era of technology, the role of science is wide and profound.

B.O. Ogunleye and O. Fasakin, in the study of Agbaje and Alake (2014) emphasized that scientific knowledge is important in boosting national prestige, national income and international rating of the country. What gives birth to the production of microcomputers and innovative applications to gain unparalleled national wealth, military potential and national prestige are all in recognition of science.

Owu-Ewie (as cited in Mirabueno, 2014) concluded that in national development, sciences and mathematics is very crucial. The nation cannot afford to train citizen who are scientifically and mathematically weak. Language is the identified factor that is accountable for the appalling performance of students in science and technology. The fact that language enhances science and mathematics learning in the basic education level, it is significant to demonstrate the positive correlation exists between language, science and mathematics performance. In this research science achievement is defined as the arithmetic average of all final ratings obtained by students on science.

GPA as a Factor of Physics Performance

How the students will perform in college is often indicated in the grades a student receives in high school. Grades do provide a good frame of reference for college admission

officers, but it is not the only determinant of future college success. These officers assess school transcript and describe scholarship and acceptance.

In the study done by the Center for Studies in Higher Education at Berkley, the best single predictor of cumulative fourth-year college GPA is the high school GPA. This stands out as the strongest cumulative college grades in all academic major fields (Geiser, 2017).

Zhang (2010) in the study of Mirabueno (2014) confirmed that the good predictor of students class performance (r=0.720) is the grade point average (GPA). His reviewed attempted to eliminate the suspicion that the predictive value of GPA in one basic science subject hold no predictive value to other subject of study. It was demonstrated in the study that GPA can be used to predict grades in all basic science subjects.

High school GPA is typically the strongest predictors of first year college GPA in the several studies conducted by ACT. Allen (2016), discussed that meta-analysis typical correlation with first year GPA of 0.38 for composite score and 0.47 high school GPA indicated a not so large difference.

Hiss and Franks (2014) cited evidence that high school grade point average predicts performance more accurately than standardized exam scores. Consistent with previous analysis, the study found that high school GPA was a strongest predictor of performance than were standardized examination scores (Hodara and Cox, 2016)

Nevertheless, high school GPA may be a less reliable predictor of performance in particular subgroup of students. The reliability of high school GPA have been questioned by several researchers because it does not account for comparability across schools (Camara and Michaelides 2005, Borneman and Connelly 2008).

Similar argument was presented by Markle and Robbins, (2013), about the reliability of high school grade point average as predictors of students' performance in different ages. The compassion between the ability of students who delay college entry over the ability of students who matriculate after high school graduation is the reasons that grade point average are less accurately represented. The predictive utility of GPA could be limited if the reliability is diminished under such condition.

Farrington, et al. (2012) recommend that high school GPA measure not solely the data and psychological skills captured by standardized examination scores and alternative competencies that are non-cognitive factors of measurement of high school grade point average.

In this study GPA refers to the arithmetic average of all final ratings obtained by students.

General Scholastic Aptitude (GSA) as a Factor of Physics Performance

In Philippine educational setting, the student's academic performance or how well a student meets standard set by the school itself is a measurement of his success.

Baruck (2015) (as cited in Acidre et al., 2013) stated that the National Career Assessment Examination (NCAE) is a paper and pencil test using multiple choices format. It is a standardized test that determines student's strength in different career fields and measures student's general scholastic knowledge taken by high school students.

In determining the best career fit for a student only one part of the bigger picture is taken from the NCAE test result. But, students should not make major decisions based on NCAE results alone. Their own grades and interest should be considered in deciding on what course of study and career they will make (Ross, 2018). A student who gets a higher score on ACT or SAT

is slightly more successful in college. Nevertheless, a standard test scores don't always predict future performance (Collegevine, 2017).

Lock (2010) as cited in Mirabueno, (2014) stated that aside from academic achievement as reflected in GWA, another measure that is worth looking into is student's school ability. School ability is additionally spoken as scholastic skill.

Since grades can vary widely by teachers and school the employers and colleges have generally preferred standardized test like SAT. "It is the measurement of one's knowledge of the material and the thing they knew and how well they do at taking things (Staley, 2016).

In this study GSA refers to the standard scores in the General Scholastic Aptitude part of the NCAE. It is a composite of the Scientific Ability (SA), Mathematical Ability (MA), Reading Comprehension (RC), Verbal Ability (VA), and Logical Reasoning Ability (LRA)

Synthesis

The literature and studies reviewed offer information that has direct or indirect bearing on this study. With that modest amount of literature, the researcher came up with her conceptual paradigm for the study. The manner which the previous studies were accomplished somehow guided the researcher on how to conduct the present study in both qualitative and quantitative manners and the results were utilized in providing meaningful interpretation for the findings of the present study.

The literature presented in this chapter are relevant to the present study because they focused on determining prediction variables which affect academic performance or achievement of the student in physics. Some of these studies also exerted effort on identifying the best

predictors of academic performance. However, they differ in scope. In the present study, the predictive variables were categorized and the academic performance in physics was the dependent variable. Furthermore, the present study looked into the mean difference of the student's academic performance in physics in terms of the selected predictors which are significant to students' performance.

The results of the study focused on which certain predictors that could be significant on the students' performance. Moreover, this study would verify some predictors which play a significant role in the academic achievement in physics.

Conceptual framework

It is no easy task to predict student's future performance based on past achievement. School and other institutions used to spend their resources wisely to develop a tool to assess student's performance.

In the process, an intellectual appraisal is a must to evaluate and anticipate problems cause by a child. The impact of the scholastic milieu on the individual learner tend to influence and facilitate the transformation of students (Andaya, 2015).

Many students who have poor background in the English language. Understanding of many scientific concepts poses problems in the understanding of many scientific concepts. In the recent past, the performance of students in English has been deteriorating. Knowledge of students in other subject in the curriculum is also affected by the abilities of the students in English as asserted by other researchers (Akintola, 1985 and Adesoji 1997). Abdullah, (2012) explained that the students' performance expands good communication skills of students.

Singh and Malik, (2016) stated that to inculcate confidence, to be trained from failures to successes, and to try new ways of conveying meanings, a student's need to use new language to communicate. Thus, competence of students in English may relate to their performance in physics.

Many of the expressions used in physics are borrowed from mathematics, so Physical sciences like Physics cannot do without mathematics. Yeo (2013) cited that mathematics is an intrinsic component of science that serves as a universal language and indispensable source of intellectual tools. Science and Technology widely regarded Mathematics as its language. It is the bedrock that provides the spring board for the growth of technology; it is also the gate and key to the sciences. In the modern culture of science and technology, the importance and contribution of mathematics is expressed as "Without mathematics, there is no science and without science there is no modern technology and while not trendy technology there's no trendy society. In alternative words, arithmetic is that the precursor and also the queen of science and technology and the indispensable single element in modern societal development." It serves as a symbolic expression in physics to show the structure of the relationship between different factors. Thus, a student who is excellent in mathematics is expected to be excellent in physics as well.

Majority of the researchers in the world applied the GPA to assess the performance of the students. Singh et al. (2016) applied GPA to evaluate performance of the students in a particular subject. Darling (2015) and Galiher (2016) utilized GPA to evaluate performance of the students. Other researchers assessed the students' performance through the previous year result or the outcome of a particular subject (Tahir, 2011 and Naqvi, 2014). Thus, all these studies explore whether GPA is correlated with the performance in physics.

Scholastic aptitude tests are designed to assess subject- related skills, comprehension and insight, using non-routine problems which require little subject-specific knowledge (Fayombo, 2011). The term 'aptitude' means apt, appropriate and suitable, implying that the definition of aptitude is situation- specific. The concept exists in the person-situation interface, rather than in the person alone. He defines aptitudes as 'initial states that influence later developments, given specified conditions'(p. 112), implying a readiness to respond to or learn from a given situation. Thus, scholastic aptitude of the students may be linked to performance in physics.

The variables cited previously are just some of the many variables that may influence the performance in physics. How these variables relate with the performance of the students in physics is the focus of this study.

The following diagram illustrates the conceptual framework of the study.

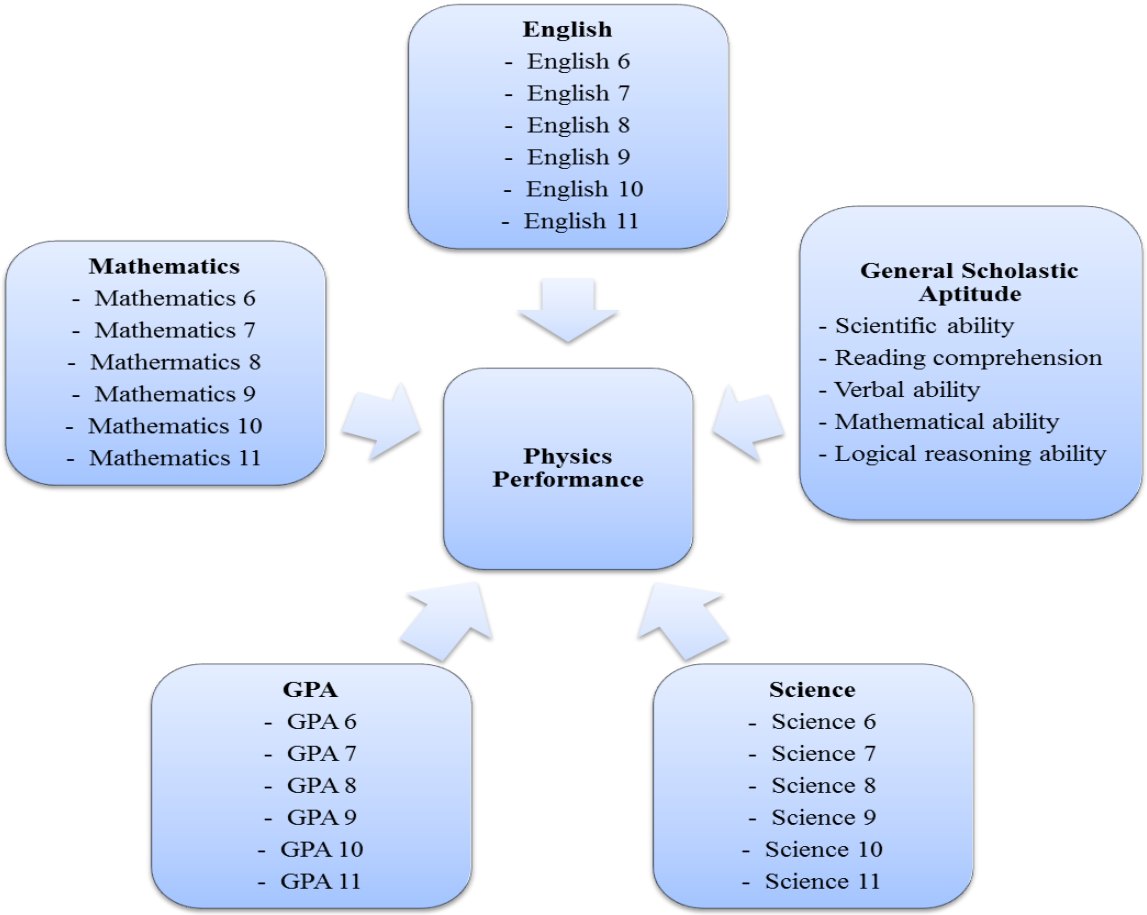


Figure 2. The research paradigm showing the variables associated with performance in physics.

The boxes surrounding physics performance contains the five independent variables in the study. The arrow denotes the link of these variables to student's performance in physics. This describes that each of the independent variables is sufficient but not necessarily influences physics performance

Statement of the problem

How the students accomplish different tasks given to them by their teachers, how to deal with their studies and how they cope with different factors, refer to us as academic achievement (Balabat, et al, 2016). It talk about to "how well a student meets standards started by government and also the school itself".

The aim of imparting knowledge and skills is the idea of enhancing good academic performance established by the school (Olani, 2012).

MARHS is a school forged by its conviction and idealism towards the pursuit of academic excellence. While some students perform highly, others do not perform well, thereby, the academic community and quality assistance committee have clearly noted these. If these poor performance goes unchecked, the school may lose its reputation and may result in loss of confidence in its graduates. It is not yet known why some students fail to attain the standards expected of them that causes much concern. Although, there is a lack of sufficient research in the case of MARHS as to what factors affect the students' academic achievement in physics. Therefore, the researcher would like to establish a predictors that may influence the academic achievement among SHS students at MARHS with specific reference to English, Mathematics, Science, GPA, and Scholastic Aptitude ratings.

The primary objective of this study is to determine which among the predictors greatly influence the academic achievement in physics of students of MARHS. Specifically, it aims to answer the following questions:

1. How can the students be described in terms of the following variables, namely:
    1.1 English Achievement (ENG),
    1.2 Mathematics Achievement (MATH),
    1.3 Science Achievement (SCI),
    1.4 Grade Point Average (GPA), and
    1.5 General Scholastic Aptitude (GSA)?
2. What is the performance of students in physics (PHYSICS)?
3. Which of the variables are correlates of physics performance?
4. Which of the variables serve as the best predictors of physics performance?

Significance of the Study

Sufficient research has been done on predictors affecting the academic achievement of student's success and student's poor performance in physics and how is the study going to proceed and gain its meaning if there is a scarce information about academic achievement of students among SHS of MARHS. It is in this connection that this researcher looks for ways to examine the predictors of success in physics which may offer hope to those who take interest in teaching and learning physics. The result of this study will be useful and significant to the following individuals:

Physics teachers. Teachers should not take for granted the role they play in encouraging their students to be motivated in physics and improved their performance. Thereby, this may serve as an eye opener to create and innovate instruction and use varied and appropriate teaching strategies and approaches.

Department Heads. The role of the head in influencing the students to improve their performance is indirect but impressive. Realizing the salient factors that are related to the performance of the students, he/she has to organize or implement a plan of monitoring the teaching performance and the relationship of the teachers to their students. Besides, the kind of examination given and the reading materials provided to the students should likewise be supervised carefully. Moreover, to improve and develop program for school advancement, the result of this study could serve as a baseline data to organize and implement plan of monitoring the performance of teachers.

Curriculum Planners. The result of this study will help them evaluate the existing programs in terms of the needs and abilities of the students and make necessary changes as required.

Future Researchers. This study could be a future reference material for the researches done in Physics. The findings of the study could provide other researchers with a guide on what to focus on and develop to improve students' achievement. Furthermore, this study will also be a challenge to future researchers because they can pursue an investigation of similar nature but uncover other variables that are not identified in the present study.

Scope and Delimitation of the Study

This study focused on the 100 Senior High School students, fifty (50) males and 50 females of Manuel A. Roxas High School (MARHS) in the 5th District of Manila in the academic year 2017-2018. This study did not intend to provide conclusive answers and to go beyond the population selected for the purpose of the study.

The content scope covered five (5) independent variables which were investigated to identify whether they are factors or not, of physics performance.

Definition of Terms

The following terms are defined according to their use in the study to help every reader in establishing a clearer view of the study.

Predictor Variable- These are characteristics that make the outcomes or objectives vary or differ. In this study, they consist of selected variables which were investigated to find out if they affected the student's performance in Physics at MARHS. As used in this study, predictor variables are classified as Sex, ENG6, ENG7, ENG8, ENG9, ENG10, ENG11, MATH6, MATH7, MATH8, MATH9, MATH10, MATH11, SCI6, SCI7, SCI8, SCI9, SCI10, SCI11, GPA6, GPA7, GPA8, GPA9, GPA10, GPA11, SA, RC, VA, MA, LRA, and GSA.

Performance/Achievement **-** refers to the knowledge gained or skills developed in the school subjects designated by the result of the test. In this study, the achievement or performance refers to the final grade of the student in physics.

ENG6, ENG7, ENG, ENG9, ENG10, ENG11- refers to the final ratings obtained by students from grades 6 to 11.

ENG- refers to the arithmetic average of all earlier mentioned final ratings obtained by students in English.

MATH6, MATH7, MATH8, MATH9, MATH10, MATH11- refers to the final ratings obtained by students from grades 6 to 11.

MATH- refers to the arithmetic average of all earlier mentioned final ratings obtained by students in mathematics.

SCI6, SCI7, SCI8, SCI9, SCI10, SCI11- refers to the final ratings obtained by students from grades 6 to 11.

SCI- refers to the arithmetic average of all earlier mentioned final ratings obtained by students in science.

GPA6, GPA7, GPA8, GPA9, GPA10, GPA11- refers to the final ratings obtained by students from grades 6 to 11.

GPA- refers to the arithmetic average of all earlier mentioned final ratings.

GSA- refers to the standard scores in the General Scholastic Aptitude part of the NCAE. It is a composite of the SA, RC, VA, MA, and LRA.

Students – Grade 12 students enrolled at the Manuel A. Roxas High School during the academic year 2017-2018.

Chapter II

Research Methodology

This chapter summarizes the method in which the study was administered. The vital factors are the research design, the research procedure, the respondents of the study, the instruments used and the statistical tools used in the analysis of the data gathered.

Research Design

This research determined the predictors affecting the performance in physics of Senior High School students at Manuel A. Roxas High School in the 5th District of Manila. Descriptive research, in particular, predictive correlation research was used in this study. Descriptive research characterizes a given state of affairs as fully carefully as possible. While, correlational research design includes studying the interrelation among variables within a single group and suggests the possibility of cause and effect. The distinctive characteristic of correlational research is searching out connections among variables. Its main aim is to explain the underlying phenomena and to identify the relationship among variables (Andaya, 2016).

Descriptive research is fact-finding with adequate information (Lansangan, *et al.* 2015). It is more than just a data-gathering but a reflective thinking. From the point of view of objectiveness, the true essence of the collected data should be reported and follow a logical and careful classification of data after. The obtained facts can be a valid expression of central tendency or deviation, or of correlation, except the report is not research unless the explanation of those data is not shown up to the level of interpretation. Data should be subjected to the thinking method in terms of ordered reasoning.

For Balbalosa (2010), the descriptive method concentrates on the present condition. The objective is to look for truth, which may come in different forms such as increased quantity of knowledge, and generalization, or increased insight which is factor operating, discovery of a causal relationship and accurate formulation of solved problems.

Descriptive research was used to determine which of the predictors– English Achievement, Mathematics Achievement, Science Achievement, GPA achievements, and GSA,

and its composite; SA, RC, VA, MA, and LRA largely affect the academic performance of the SHS students in physics at MARHS.

This study employed predictive correlation method since the measured data are already existing and the respondent's number is not too large.

Predictive correlational studies is also used once a researcher is curious about deciding whether or not an identified antecedent documented characteristic (or set of characteristics) will direct to the prediction of a later characteristic (or set of characteristics)

Respondents of the Study

A sampling of 100 students, 50 males and 50 females selected from 300 Senior High School (SHS) students of MARHS in the 5th District of Manila during the Academic Year 2017-2018. The 100 respondents were selected from the seven (7) sections of Grade 12 SHS department; G12-Pangilinan, G12-Comerford, G12-Logro, G12-Romulo, G12-Zuckerberg, G12-Locsin, and G12-Vidal Tan, respectively. This study employed a combination of simple random sampling and purposive sampling techniques. In order to prevent bias and ensure that each SHS student had as fair chance of being selected a simple random sampling was employed.

Mizner (2014) stated that in creating equivalent representative groups that are essentially the same on all significant variables a randomization is effective. Since, the researcher wanted to study the performance of only SHS student a purposive sampling was used in choosing the respondents.

Research Locale

Manuel A. Roxas High School is a public secondary school located in Paco, Manila instituted in 1948. It offers a program that features Academic and Technical-Vocational-Livelihood (TVL) strands and a Special Science curriculum for selected students. It is named after the fifth president of the Philippines, Manuel A. Roxas ("Manuel A Roxas High School" 2018).

Instrumentation

Correlation studies involved a predictors and outcome variables. A precise mathematical expression of the types of relationship between variables is a correlational coefficient, suggesting the extent to which scores on one variable co-vary with scores on another variable" (Gall et al., 2012, p. 212). Variable predictors utilized to answer the main problem of this study were gathered through the final ratings obtained by students from grades 6 to 11 on the following fields of study; English, Mathematics, Science, and GPA; and the standard scores in the General Scholastic Aptitude part of the NCAE which includes SA, RC, VA, MA, and LRA filed at the school registrar's office. The outcome variable was measured by the student's final performance in physics. The details of the instruments used are explained below.

Collection of data

1. General Academic Aptitude (Grade 6 and Junior High School Grade Scores)

Data were gathered from the personal file of the respondents or from the form 137 of the students in the Registrar office where the records of the students are filed. English, Mathematics,

Science, and GPA are the following measure of general academic aptitude will be considered as factors.

2. General Scholastic Aptitude (NCAE)

High School students in the Philippines take test to determine their strengths in different career fields through the National Career Assessment Examination or NCAE. It replaces the former National College Entrance Examination (NCEE), and it was first administered in January 2007. Its purpose is to assist students to ponder which courses they should study in college and what career match they are best suited for.

It also measures students' general scholastic knowledge. However, the NCAE also tests vocational aptitude, occupational preferences and entrepreneurial skills (Ross, 2018).

The test is composed of learning competencies in their major subject areas and reported as standard scores (see Table 2). The standard scores are from a range of 500 to 800 and a standard deviation of 100.

The scores in the Aptitude test (NCAE) of the students were taken from the personal file of the respondents in the Registrar office where the records of the students are filed.

3. Physics Performance

Physics is a study which is unique and fascinating to most people because it is hard to teach and even harder to comprehend (Adeyemo, 2010).

The learning of physics is difficult at best and almost impossible at worst because of its enormous importance to science and technology although it is difficult and almost impossible to learn, still, there is considerably substantial interest in student's performance in physics.

Student success in physics can be outlined using traditional measures of academic achievement like physics grades which represent progress toward the degree.

The academic performance in physics was taken from the grade sheet submitted by the instructor in her respective department where the students belong.

Statistical Treatment of Data

The classification of the data formed the basis of the research design and the statement of the problem. To determine the frequency of responses and to facilitate the presentation and interpretation of results, the data and information were tallied. To generate an appropriate analysis of the study, statistical measures were employed. The research hypotheses were tested at 0.050 level of significance. The descriptive statistical measure: minimum, maximum, arithmetic mean, standard deviation, and coefficient of variation were used to determine the profile of the students. The arithmetic mean of high school grades was interpreted as follows:

Table 1
Interpretation of Grades

Range	**Remark**
95-100	Outstanding
90-94	Excellent
85-89	Above Average
80-84	Average
75-79	Fair
70-74	Needs Improvement

Table 1 shows that the grades vary from 70% to 100%. Each grade is interpreted as needs improvement, fair, average, above average, excellent, and outstanding.

Standard scores of NCAE were interpreted as follows:

Table 2
Interpretation of Standard Scores

Range	Remark
$700 \leq$ score < 800	Outstanding
$600 \leq$ score < 700	Excellent
$500 \leq$ score < 600	Above Average
$400 \leq$ score < 500	Average
$300 \leq$ score < 400	Fair
$200 <$ score < 300	Needs Improvement

Table 2 shows how the standardized scores were interpreted. The remarks are needs improvement to outstanding.

Simple rectilinear regression was used to show relationship between the academic performance in physics, the predictive variable when taken singly, and multiple rectilinear regressions was used to show relationship when taken collectively. The Pearson's product moment coefficient of correlation (*r*) and t- test were used to verify if the value of the computed correlation coefficient were significant. Pearson (*r*) values that at least 0.400 and significant were considered as correlates.

Table three was used to interpret the magnitude of Correlation coefficient.

Table 3
Interpretation of Pearson r

Range	Remark
$\|r\|=1.000$	Perfect positive / negative rectilinear correlation
$0.900 < \|r\| < 1.000$	Very high positive /negative rectilinear correlation
$0.800 < \|r\| \leq 0.900$	High positive / negative rectilinear correlation
$0.600 < \|r\| \leq 0.800$	Marked substantial positive/ negative rectilinear correlation
$0.400 < \|r\| \leq 0.600$	Moderate positive/ negative rectilinear correlation
$0.200 < \|r\| \leq 0.400$	Low positive / negative rectilinear correlation
$0.000 < \|r\| \leq 0.200$	Negligible positive /negative rectilinear correlation
$\|r\| = 0.000$	No rectilinear correlation

Table 3 shows how the pearson *r* values were interpreted. When the absolute value is equal to 1.000 there is a perfect positive or negative rectilinear correlation. If the *r* value is equal to 0.000, a no rectilinear correlation is used as a remark.

Table four shows the interpretation of the obtain *p-level.*

Table 4
Interpretation of p-level

Range	**Remark**
$p \geq 0.050$	Not Significant
$0.001 \leq p < 0.010$	Significant
$0.010 \leq p < 0.050$	Highly Significant
$p < 0.001$	Extremely Significant

Table 4 shows the interpretation of the obtain *p- level.* The variables considered as significant predictors of the physics performance was then determined by computing the *p-level* value through the multiple regression. The default or critical value is p-level 0.050; however, interpretation of significance is enhanced by breaking down p-level less than 0.050.

Chapter III

Results and Discussion

This study investigated the predictors correlated with the academic achievement in physics of the students in MARHS. To gain sufficient insights, the specific problems were treated individually in the following discussions in light of the data made available to the researcher.

1. How can the students be described in terms of the following independent variables, namely:

1.1 English Achievement (ENG)

1.2 Mathematics Achievement (MATH)

1.3 Science Achievement (SCI)

1.4 Grade Point Average (GPA), and

1.5 General Scholastic Aptitude (GSA)?

The study investigated five predictors that may influence the academic performance of the students in physics. These were English achievement, Mathematics achievement, Science achievement, GPA, and General Scholastic Aptitude. The interpretation of the scores was based on table 5 for English achievement; Table 6 for Mathematics achievement; Table 7 for Science achievement; Table 8 for GPA, Table 9 for General Scholastic Aptitude, and Table 10 for the performance of students in physics.

Table 5 shows the English achievement of the students. It can be observed from the table that ENG6 has the highest mean rating of 86.29 with a minimum rating of 78.00 and a maximum rating of 93.00 with a quantitative description of above average performance. Second highest is ENG11 with a mean rating of 84.23 with a minimum rating of 75.00 and a maximum rating of 96.00 with a quantitative description of average performance. The lowest is ENG7 with a mean rating of 83.27 from a minimum rating of 76.00 and a maximum rating of 89.00 with a quantitative description of average performance. The student has an average overall performance in English achievement.

Table 5. English Achievement of Students
(N=100)

Variable	Min	Max	Mean	Std. Dev.	Remark[a]
ENG6	78.00	93.00	86.29	2.840	Above Average
ENG7	76.00	89.00	83.27	2.659	Average
ENG8	76.00	89.00	83.50	2.549	Average
ENG9	76.00	88.00	83.80	2.621	Average
ENG10	78.00	88.00	83.97	2.329	Average
ENG11	75.00	96.00	84.23	5.805	Average
ENG	79.17	88.50	84.18	2.084	**Average**

a. based on mean

The vital role which mathematics plays in education is derived from interdisciplinary values which the subject seeks to inculcate in the learners. Competency in Mathematical is an integral component of any scientific degree (Koenig et al., 2012), and the ability to apply mathematical and statistical concept in the context of science is a part of essential attention (Belward et al. 2011)

Table 6 displays the achievement of students in mathematics.

Table 6. Mathematics Achievement of Students
(N=100)

Variable	Min	Max	Mean	Std. Dev.	Remark[a]
MATH6	78.00	94.00	86.20	2.774	Above Average
MATH7	78.00	88.00	83.57	2.459	Average
MATH8	76.00	90.00	83.66	2.491	Average
MATH9	76.00	88.00	83.86	2.454	Average
MATH10	77.00	89.00	84.25	2.254	Average
MATH11	75.00	95.00	83.80	4.703	Average
MATH	79.67	88.67	84.22	1.850	**Average**

a. based on mean

Table 6 shows the Mathematics achievement of the students. It can be observed from the table that MATH6 has the highest mean rating of 86.20 with a minimum rating of 78.00 and a maximum rating of 94.00 with a quantitative description of above average performance. Second highest is MATH10 with a mean rating of 84.25 with a minimum rating of 77.00 and a maximum rating of 89.00 with a quantitative description of average performance. The lowest is MATH7 with a mean rating of 83.57 from a minimum rating of 78.00 and a maximum rating of 88.00 with a quantitative description of average performance. The student has an average overall performance in Mathematics achievement.

Table 7 displays the achievement of students in science.

Table 7. Science Achievement of Students
(N=100)

Variable	Min	Max	Mean	Std. Dev.	Remark[a]
SCI6	80.00	93.00	86.56	2.921	Above Average
SCI7	75.00	90.00	83.86	2.961	Average
SCI8	76.00	91.00	84.03	2.805	Average
SCI9	78.00	90.00	84.17	2.462	Average
SCI10	78.00	91.00	84.57	2.591	Above Average
SCI11	75.00	95.00	84.18	5.821	Average
SCI	79.50	88.83	84.56	2.223	**Above Average**

a. based on mean

Table 7 shows the Science achievement of the students. It can be perceived from the table that SCI6 has the highest mean rating of 86.65 with a minimum rating of 80.00 and a maximum rating of 93.00 with a quantitative description of above average performance. Second highest is SCI10 with a mean rating of 84.57 with a minimum rating of 78.00 and a maximum rating of 91.00 with a quantitative description of above average performance. The lowest is SCI7 with a mean rating of 83.86 from a minimum rating of 75.00 and a maximum rating of 90.00 with a

quantitative description of average performance. The student has an above average overall performance in Science achievement.

Table 8 shows the GPA achievement of the students.

Table 8. GPA Achievement of Students
(N=100)

Variable	Min	Max	Mean	Std. Dev.	Remark[a]
GPA6	78.00	94.00	87.20	2.720	Above Average
GPA7	75.00	88.00	84.38	1.953	Average
GPA8	76.00	89.00	84.34	2.280	Average
GPA9	78.00	89.00	84.44	2.105	Average
GPA10	78.00	89.00	85.03	2.007	Above Average
GPA11	76.00	92.00	83.66	4.436	Average
GPA	80.00	88.33	84.85	1.653	**Above Average**

a. based on mean

Table 8 shows the GPA achievement of the students. It can be observed from the table that GPA6 has the highest mean rating of 87.20 with a minimum rating of 78.00 and a maximum rating of 94.00 with a quantitative description of above average performance. Second highest is GPA10 with a mean rating of 85.03 with a minimum rating of 78.00 and a maximum rating of 89.00 with a quantitative description of above average performance. The lowest is GPA8 with a mean rating of 84.34 from a minimum rating of 76.00 and a maximum rating of 89.00 with a quantitative description of average performance. The student has an above average overall performance in GPA achievement.

Table 9 shows the Scholastic Aptitude of the students

Table 9. Scholastic Aptitude of Students
(N=100)

Variable	Min	Max	Mean	Std. Dev.	Remark[a]
SA	396.45	800.00	640.52	100.217	Excellent
RC	101.97	771.53	599.69	100.941	Above Average
VA	184.22	771.52	625.02	111.003	Excellent
MA	210.76	787.70	620.92	138.947	Excellent
LRA	160.36	780.03	660.41	99.273	Excellent
GSA	300.25	857.40	540.02	131.496	**Above Average**

a. based on mean

It can be deduced from the table that of the different components of General Scholastic Aptitude, the composites LRA with a mean rating of 660.41 from minimum of 160.36 and maximum of 780.03 is the highest with a quantitative description of excellent, while SA with mean rating of 640.52 is the second highest with a minimum of 396.45 and a maximum of 800.00 and has a description of excellent. The lowest is RC with a mean of 599.69 from a minimum of 101.97 and a maximum of 771.53 with an above average description. The student has an above average overall performance in GSA achievement.

Results reveal that composites LRA, SA, VA, and MA are excellently manifested in a student to assess their skills in comprehension and insight, using non-routine problems which require little subject-specific knowledge.

2. **What is the performance of the students in physics?**

Physics is a unique and fascinating discipline. Ernest Rutherford once said, "All of Physics is either impossible or trivial. It is not possible till you realize it then it becomes trivial." It is hard to teach and harder to comprehend. It also makes immerse academic demands on students in its learning (Adeyemo, 2010).

Table 10 shows the Performance of Students in Physics

Table 10. Physics Performance of Students
(N=100)

Variable	Min	Max	Mean	Std. Dev.	Remark[a]
Physics	75.00	92.00	84.41	3.833	**Average**

a. based on mean

The table reveals that the students had an average physics performance with a mean of 84.41 from a minimum of 75.00 to a maximum of 92.00. This implies that the students have typical skills in comprehension, analysis, evaluation, and interpretation of results involved in Physics.

3. Which of the variables are correlates of physics performance?

The Pearson's product moment coefficient of correlation *(r)* and the two-tailed probability for each correlation coefficient were used to identify the variables that are correlates of physics performance. Pearson *r* values that at least 0.400, significant at 0.05 were considered as correlates of physics performance. Information provided on table three was used to interpret the results of the correlates of physics performance as shown in table eleven.

Table 11 shows the relationship of sex and physics performance of students

Table 11.Relationship Between Sex and Physics Performance of Students

Level	r_{OBS}	r^2_{OBS}	$1-r^2_{OBS}$	p-level[a]	Remark [b]
SEX	-0.176	0.031	96.9%	0.080	negligible negative correlation; not significant

a. df=98, r_{CRIT} =1.620
b. based on r_{OBS}

As presented in Table 11, there is no significant relationship between sex and physics performance of the students. The variable sex has 0.080 *p-level* value which means the sex is not related to the physics performance of the students.

Table 12 shows the relationship between the physics performance and English achievement of students.

Table 12. Relationship Between Physics Performance and English Achievement of Students

Level	r_{OBS}	r^2_{OBS}	(%)$1-r^2_{OBS}$	(%) p-level[a]	Remark [b]
ENG6	0.227	5.2	94.8	0.023	low positive correlation; significant
ENG7	0.158	2.5	97.5	0.117	negligible positive correlation; not significant
ENG8	0.058	0.3	99.7	0.564	negligible positive correlation; not significant
ENG9	0.161	2.6	97.4	0.109	negligible positive correlation; not significant
ENG10	0.220	4.8	95.2	0.028	low positive correlation; significant
ENG11	0.749	56.1	43.9	0.000+	marked substantial positive correlation; significant
ENG	**0.519**	**26.9**	**73.1**	**0.000+**	**Moderate positive correlation; significant**

a. df=98, r_{CRIT} =1.620

b. based on r_{OBS}

The table reveals that there is a significant relationship between physics performance and English achievement of students in the following areas of concentrations namely: ENG6, ENG10, and ENG11. From these areas, ENG11 has a highest coefficient of correlation (r) of 0.749 followed by ENG6 which has a coefficient of correlation (r) of 0.227 and the lowest is ENG10 with a coefficient of correlation of 0.220 which mean that English achievement in these areas of concentration is related to physics performance of the students. ENG accounts for 26.9% of the variation on Physics.

Results disclose that grades of the students especially from ENG11 and ENG needed to be outstanding as this been the pre-requisite in learning physics. This supported the findings of Kao and Thompson in the study of Ardacheva, (2010) which attempt to consider that "New

language learned is a developmental process that requires gradual perception and skills over time". Based on the table where mostly significant, the importance of English language for enhancing physics attainment through improved communication ability can never be over emphasized. Academic achievement in science is positively related to a student's proficiency in the English language. When a student's proficiency is high, it will certainly affect and improve academic performance (Aina et al., 2013).

Few other researchers like Racca and Lasaten (2016), Young (2015), Daller and Phelan, Gunderson, Bettinger, Evans, and Pope all corroborated and agreed on the importance of the English language in learning.

However, Bailey and Butler negates the study that sufficient academic language proficiency is a requirement for academic success. Contrary to all studies, Dooney and Oliver, in the study of Wilson, et al (2012) found out that there is no significant relationship between language proficiency and academic achievement.

Table 13 shows the Relationship between physics performance and mathematics achievement of students

Table 13. Relationship Between Physics Performance and Mathematics Achievement of Students

Level	r_{OBS}	r^2_{OBS}	(%)$1-r^2_{OBS}$ (%)	p-level[a]	Remark [b]
MATH6	0.206	4.2	95.8	0.040	low positive correlation; significant
MATH7	0.172	3.0	97.0	0.087	negligible positive correlation.; not significant
MATH8	0.203	4.1	95.9	0.043	low positive correlation; significant
MATH9	0.254	6.5	93.5	0.011	low positive correlation; significant
MATH10	0.131	1.7	98.3	0.195	negligible positive correlation; not significant
MATH11	0.754	56.9	43.1	0.000+	marked substantial positive correlation; significant
MATH	**0.537**	**28.8**	**71.2**	**0.000+**	**Moderate positive correlation; significant**

a. df=98, r_{CRIT} =1.620

b. based on r_{OBS}

The table reveals that there is mostly a significant relationship between physics performance and mathematics achievement of students in the following areas of concentrations, the highest coefficient of correlation MATH11 (r = 0.754), second highest MATH9 (r = 0.254), followed by MATH6 (r = 0.206), and MATH8 (r = 0.203) the lowest coefficient of correlation. MATH accounts for 28.8% of the variance in Physics. This mean that mathematics achievement in these areas of concentration is related to physics performance of the students.

The results reveal that grades of the students from these levels needed to be significantly important to understand and apply concept of science and technology. This supported the findings Nizoloman (2013) to promote the habit of accuracy, logical, systematic, and orderly arrangements one has to train the mind on attention and concentration which are bound to be useful for the students throughout life. Based on the results, all levels of competencies were mostly significant, only two; MATH7 and MATH10 conferred to be insignificant. Mathematics achievement, like other academic field, has its own language, specialized grammar and vocabulary and a student has to engage explicitly in the use of this language to integrate for content understanding.

An inability to demonstrate fundamental quantitative skills at the school level stymies deep learning, contributes to student attrition, and may have dire implications (Thompson et al. as cited in Hine and Anderson, 2015).

Table 13 also reveals that mathematical competency as shown in MATH6, MATH8, MATH9, MATH11 and MATH is an integral component of any scientific degree (Koenig et al., 2012). Applying mathematical and statistical thinking in the context of science can demonstrate fundamental quantitative skills at the school level (Thompson et al. as cited in Hine and Anderson, 2015).

The results confirmed Yeo Kee Jiar in the study of Awodun (2013), Hogan in the study of Muhammad (2014), and findings of Udom indicating that success in Physics can be based from the basis for predicting success in Physics in the mathematics performance of the students.

However, it contradicts the findings of Muhammad and Bello and Ariyo (2014) revealing that high mathematical competence in the secondary school is not sufficient for high performance in Physics thereby cannot sufficiently predict performance of the students.

Table 14 shows the Relationship between physics performance and the science achievement of students.

Table 14. Relationship Between Physics Performance and Science Achievement of Students

Level	r_{OBS}	r^2_{OBS} (%)	$1-r^2_{OBS}$ (%)	p-level[a]	Remark [b]
SCI6	0.059	0.3	99.7	0.562	negligible positive correlation; not significant
SCI7	0.259	6.7	93.3	0.009	low positive correlation; significant
SCI8	0.253	6.4	93.6	0.011	low positive correlation; significant
SCI9	0.179	3.2	96.8	0.075	negligible positive correlation; not significant
SCI10	0.140	2.0	98.0	0.165	negligible positive correlation; not significant
SCI11	0.632	39.9	60.1	0.000+	marked substantial positive correlation; significant
SCI	**0.459**	**21.1**	**78.9**	**0.000+**	**Moderate positive correlation; significant**

a. df=98, r_{CRIT} =1.620

b. based on r_{OBS}

The table reveals that there is a significant relationship between physics performance and Science achievement of students in the following areas of concentrations namely: SCI7, SCI8, and SCI11. From these areas, SCI11 has a highest correlation coefficient (r) of 0.632 followed by SCI7 which has a correlation coefficient (r) of 0.259 and the lowest is SCI8 with a coefficient of correlation of 0.253 which mean that Science achievement in these areas of concentration is related to physics performance of the students. SCI accounts for 21.1% of the variation on Physics.

Results show that for students' grades before entering SCI7 and before leaving SCI11, and before entering college, SCI grades must be significantly high. This proves that science has become an essential tool to any nation, wishing to progress in the socio- economic world will afford to relegate its learning in school. In this era of modern technology, the role of science is wide and profound. To this effect, Ogunleye and Fasakin, in the study of Agbaje and Alake (2014), described the significance of scientific knowledge in hoisting national prestige, military might, national income and the international rating of the country. Moreover, the birth of science provides the production of microcomputers, innovative applications which earned and developed countries like United states of America and Japan unparalleled national wealth, military potential and enviable national prestige.

The results also affirmed Owu-Ewie's study that science is very vital to national development. It is difficult to the nations to train citizen who are scientifically weak. Therefore, it is necessary to establish that positive correlation exerts between performance in science, language and mathematics.

Table 15 shows the relationship of physics performance and the GPA achievement of students.

Table 15. Relationship Between Physics Performance and GPA Achievement of Students

Level	r_{OBS}	r^2_{OBS}	(%)$1-r^2_{OBS}$	(%) p-level[a]	Remark [b]
GPA6	-0.010	0.0	100.0	0.925	negligible negative correlation; not significant
GPA7	0.230	5.3	94.7	0.021	low positive correlation; significant
GPA8	0.201	4.0	96.0	0.045	low positive correlation; significant
GPA9	0.189	3.6	96.4	0.060	negligible positive correlation; not significant
GPA10	0.218	4.8	95.2	0.030	low positive correlation; significant
GPA11	0.724	52.4	47.6	0.000+	marked substantial positive correlation; significant
GPA	**0.497**	**24.7**	**75.3**	**0.000+**	**Moderate positive correlation; significant**

a. df=98, r_{CRIT} =1.620

b. based on r_{OBS}

The table reveals that there is a significant relationship between physics performance and GPA achievement of students in the following areas of concentrations namely: GPA7, GPA8, GPA10 and GPA11. From these areas, GPA11 has a highest correlation coefficient (r) of 0.724 followed by GPA7 which has a coefficient of correlation (r) of 0.230 and the lowest is GPA8 with a correlation coefficient of 0.201 which mean that GPA achievement in these areas of concentration is related to physics performance of the students. GPA accounts for 24.7% of the variance on Physics.

Results disclose that although high school grades are not the only factors of future success, they do provide a good frame of reference and are often an indicator of how the student will perform in college. According to a study done by the Center for Studies in Higher Education at Berkley (Geiser, 2017), high school GPA "is the best single predictor of fourth year cumulative GPA in college", and high school GPA "stands out as the strongest predictor of cumulative college grades in all major academic fields." With the qualitative description given by the results, the received grades in high school are often an indicator of how he will achieve in college. This confirmed Zhang (as cited in Mirabueno, 2014), Hiss and Franks (2014), and Hodara and Cox (2016).

However, the results contradict the study of Camara and Michaelidas (2016), Borneman and Connelly (2015) and Markle and Robbins (2013).

Nevertheless, Farrington et al. (2012) suggested that grade point in high school measure the knowledge and cognitive skills captured by standardized exam scores, and other competencies that fall under the rubric of "noncognitive factors."

Table 16 shows the relationship of physics and the scholastic achievement of students.

Table 16. Relationship Between Physics Performance and Scholastic Achievement of Students

Level	r_{OBS}	r^2_{OBS}	p-level[a]	Remark [b]
SA	0.166	0.028	0.099	negligible positive correlation; not significant
RC	0.180	0.032	0.074	negligible positive correlation; not significant
VA	0.170	0.029	0.091	negligible positive correlation; not significant
MA	0.067	0.004	0.508	negligible positive correlation; not significant
LRA	-0.155	0.024	0.124	negligible negative correlation; not significant
GSA	**-0.025**	**0.001**	**0.807**	**negligible negative correlation; not significant**

a. df=98, r_{CRIT} =1.620

b. based on r_{OBS}

The table shows that there is no single composite of scholastic achievement of students that is correlated with physics performance. From GSA coefficient of determination of 0.1% which means that GSA achievement in this area of orientation is not related to physics performance.

The results reveal differently from the study of Ross (2012) and Lock (2013) as cited in Mirabueno (2014). Accordingly, aside from academic achievement as reflected in GWA/ GPA, another measure that is worth looking into is student's school ability. School ability is referred to as scholastic aptitude.

4. Which of the variables serve as the best predictors of physics performance?

After studying the findings of what correlates physics performance on the assumptions validation, a simple rectilinear regression analysis for physics performance was used. Information provided on Table 17 was used to interpret the results of the regression analysis for the prediction of physics performance of the students.

Table 17. ANOVA: Regression

Summary of Variation	Sum of Square	df	Mean Square	F- Value		p- level	Remark
				Obs	Crit		
Regression	1146.968	31	36.999	8.189	1.620	0.000+	Significant
Residual	307.222	68	4.518				
Total	**1454.190**	**99**					

Table 17 shows the global test where there is at least one independent variable that serves as significant predictors of physics performance. This supports the implication in Tables 12, 13, 14, and 15. The sources of variation got a *p-level* value of 0.000 which means the variable ENG, MATH, SCI, and GPA were identified as significant in the physics performance of the students.

Table 18 below shows the information on the relationship between the variables in the study and the performance of the students in physics. This identifies which among the independent variables are significant predictors. The results of the regression for physics performance were verified by the Beta Coefficient and the Standard Error of Beta to determine which independent variables made a significant relationship to the prediction of physics performance. Through this step, it was possible to determine how much each variable contributed to the total variance. The table suggests that compared with other variables in the study; there were four identified significant predictors that contributed sufficiently to the performance of student in physics.

Table 18. Regression Coefficients[a]

Variable	B	SE	β	t- value$_{OBS}$	p- level	Remark
SEX	-0.571	0.585	-0.075	-0.976	0.333	not significant
ENG6	0.174	0.109	0.129	1.599	0.155	not significant
ENG7	-0.103	0.140	-0.072	-0.736	0.464	not significant
ENG8	-0.150	0.177	-0.100	-0.845	0.401	not significant
ENG9	0.280	0.179	0.191	1.559	0.124	not significant
ENG10	-0.127	0.178	-0.077	-0.711	0.480	not significant
ENG11	0.421	0.102	0.637	4.111	0.000	significant
MATH6	0.011	0.154	0.008	0.074	0.941	not significant
MATH7	-0.122	0.174	-0.078	-0.700	0.486	not significant
MATH8	-0.037	0.178	-0.024	-0.208	0.836	not significant
MATH9	0.291	0.163	0.186	1.782	0.079	not significant
MATH10	-0.403	0.199	-0.237	-2.024	0.047	significant
MATH11	0.447	0.094	0.549	4.763	0.000	significant
SCI6	0.045	0.132	0.034	0.340	0.735	not significant
SCI7	-0.059	0.157	-0.046	-0.377	0.707	not significant
SCI8	0.247	0.200	0.181	1.238	0.220	not significant
SCI9	-0.017	0.194	-0.011	-0.086	0.931	not significant
SCI10	-0.278	0.183	-0.188	-1.521	0.133	not significant
SCI11	-0.244	0.090	-0.371	-2.706	0.009	significant
GPA6	-0.191	0.144	-0.135	-1.322	0.191	not significant
GPA7	0.246	0.206	0.125	1.195	0.236	not significant
GPA8	0.105	0.185	0.062	0.567	0.573	not significant
GPA9	0.234	0.210	0.129	1.114	0.269	not significant
GPA10	-0.078	0.216	-0.041	-0.359	0.721	not significant
GPA11	0.045	0.144	0.052	0.314	0.754	not significant
SA	-0.003	0.003	-0.071	-0.997	0.322	not significant
RC	-0.002	0.003	-0.062	-0.789	0.433	not significant
VA	0.002	0.004	0.063	0.604	0.548	not significant
MA	0.000	0.003	0.008	0.079	0.938	not significant
LRA	-0.002	0.003	-0.044	-0.602	0.549	not significant
GSA	0.006	0.002	0.194	2.807	0.007	significant
R=0.842[a]		**R^2= 0.709**		**Adj. R^2= 0.697**		**SEM= 2.11052**

a. Dependent Variable: PHYSICS

We run the regression computation again, *using only the variables that are significant.* Around 70.9 percent of the variation in PHYSICS is explained by the three variables ENG11, MATH11, and GSA. A reduction to three independent variables caused a loss of eight percentage point in explained variation. It is worthwhile loss because the new model, with only three variates, is easier to understand. In addition, in the revised regression model, the three independent variables have significant regression coefficients. Note that the p- levels in our output are less than 0.050, which indicates that they are significant.

Table 19. Coefficient[a]

	Unstandardized Coefficients		Standardized Coefficients		
Variable	**B**	**Std. Error**	**Beta**	**t-value**	**p-level**
ENG11	0.429	0.067	0.65	6.430	0.000
MATH11	0.461	0.073	0.565	6.300	0.000
OGSA	0.004	0.002	0.151	2.643	0.010
R=842[a]	**R^2 = 0.709**	**Adj. R^2 = 0.697**		**SEM =2.11055**	

a. Dependent Variable: PHYSICS

We can expect an increase or decrease of 0.429 points in PHYSICS for every one-unit change in ENG11; an increase of 0.461 points in PHYSICS for every one-unit increase in MATH11; and 0.004 points increase in PHYSICS for every one-unit change in GSA.

Putting all values into a standard measure allows us to examine which of the three independent variables make a greater significant contribution to the model. The beta value, also referred to as the beta weight, is the standardized net regression coefficient. This standardization allows beta to measure the contribution of variables irrespective of the scale on which they are measured.

The variable strongly related with PHYSICS is ENG11, predicting 65.0 percent of the variance on the model. This indicates how important English language skills are related to PHYSICS. Furthermore, the relative importance of the variables drops significantly. MATH11 is the next important variables, with 56.6 percent of variance. GSA explains only 15.1 percent of the variance, which is a relatively low percentage.

Thus, the derived regression equation taken from the table was:

PHYSICS = 7.220 + 0.429 ENG + 0.461 MATH + 0.004 GSA

Findings reveal that physics performance attributed particularly to ENG, MATH, and GSA components that describe computation, analysis, and reasoning as described by Gideon (2012). This is also true in the study conducted by Mandin (1997) in the paper presented by Mirabueno (2014) who conducted a study about the relationship between Physics instruction and the difficulties encountered in problem solving by secondary students in Bohol, she found out that most of the students were weak in identifying given data, applying formulas, theories, principles and analysing problems. The students' failure to solve problems was due to their poor comprehension, weak mathematical ability, lack of knowledge in conversation, and their ability to interpret results.

This also supported the study of Mallick (2012), which mentioned that the learner should express their views in a clear, logical, and attractive manner since science is a periodical subject. Hence, it is important to have a complete knowledge of the language they use to have a good control over and to express their views and various scientific laws and principles.

Few other researchers like Ardacheva 2010, Aina *et al.* (2013), Raca and Lasaten (2016), Young (2015), Hine and Anderson 2015, Awodun 2013, and Hogan (2011) in the study of Muhammad (2014), all corroborated and agreed that the performance in English, Mathematics, and GSA components can be the basis for predicting success in Physics of the students.

However, Bailey and Butler (2013) and Bello and Ariyo (2014), negates the study that high mathematical competence and sufficient academic language proficiency is a requirement in the success in Physics.

Chapter IV

Summary, Conclusions, and Recommendations

This chapter summarizes the findings, conclusions, and recommendations relative to the problem of the study.

Summary of Findings

With the end in view of getting insight on the predictors of physics performance at MARHS, the researcher took 100 students, who had regular loads in the 2nd Semester of S.Y. 2017- 2018 at MARHS, Paco, Manila, as respondents for the study. Specific questions were raised for which the investigation sought answers, and the study revealed the ff:

1. The achievement of the senior high school students of Manuel A. Roxas High School in ENG has a mean of 82.18 and MATH has a mean of 84.22, both are average performance while SCI with mean of 84.56, GPA with a mean of 84.85; and GSA with a mean of 540.02 are above average performance;
2. The students had an average physics performance with a mean of 84.41;

3. There is an extremely significant, moderately positive correlation between physics performance on the following variables namely: ENG achievement accounts for 26.9 %, MATH achievement (28.8%), SCI achievement (21.1%), and GPA achievement (24.7%) of students' performance while, sex is not related to the physics performance and no single composite of GSA achievement of students that is correlated with physics performance; and
4. The results of the regression for physics performance were verified by the Beta Coefficient and the Standard Error of Beta to determine which independent variables made a significant contribution to the prediction of physics performance. Among the identified best predictors of physics performance when taken collectively was ENG11, MATH11, and GSA with coefficient of determination (R^2) equal to 0.709. This means that 70. 9 % is the variation contribution of these variables to academic performance in physics. The coefficient of multiple correlations (R) equal to 0.842 means that there is a high positive relationship of the combination of all the factors to academic performance in physics. At least these three predictors: ENG11 (65.0) extremely significant, MATH11 (56.5) extremely significant, and GSA (15.1) highly significant could forecast whether the student will obtain a greater performance in physics at MARHS. The Pearson product-moment correlation followed by the t-test for correlation revealed that ENG11, MATH11, and GSA were considered significantly related and it shows that there is a parallel relationship between these predictors and the physics performance grades of the students.

Results

Based on the findings, the following results are drawn:

1. A typical SHS student at MARHS has an above average performance in GSA, GPA, & SCI Achievement, but average performance in ENG and MATH;
2. The students have an average physics performance;
3. There is no significant relationship between sex and physics performance;

   In general, ENG, MATH, and GPA have a moderate positive correlation with Physics and their correlations are significant. However, GSA is not significantly related to Physics performance. There is a significant difference among the Physics performance of students when they are classified according to their ratings in ENG, MATH, and GPA; and
4. The significant predictors of physics performance are ENG11, MATH11, and GSA. At least these three predictors could forecast whether the student will obtain a greater performance in physics at MARHS.

Recommendations

In view of the conclusions drawn from the findings of the study, the ff: is recommended

1. Create proper student's profiling based on English achievement, Mathematics achievement, Science achievement, GPA achievement, and Scholastic Achievement to give a special attention to identify students who need enrichment in preparation for collegiate studies;
2. Provide continuous monitoring on the students' performance in physics and secure an intensive and rigorous academic preparation on the part of the students;

- Post-secondary academic performance of the students is affected by what a student do before and during high school. An early intervention is significant if students are less likely to acquire the needed skills and do not attain grades level competency and proficiency.

3. Enhance the integration of Physics principles in English, and Mathematics subjects to provide opportunities for the students to gain and hone the skills and concepts required for the course;
4. College performance standards should be aligned to the high school curricula;
    - College admission requirement and post-secondary academic performance expectations are frequently overestimate student's readiness for college when standardized test are not articulated well;
5. In case a secondary analysis of this research is be made further, another set of respondents must be used to verify the results and maximize the information gathered from the data; and
6. Other researchers may replicate the study using additional variables, different respondents, new setting, or different academic subjects.

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Appendices

September 15, 2017

PRISCILA DE LUNA MANALANG
School Officer In -Charge
Manuel A Roxas High School
Pres. Quirino Ext. , Paco, Manila

Thru: **MA. CRISTINA LABAY**
Senior High School Coordinator

Dear Madam,

Good day!

I would like to ask permission from your good office to allow me to have an access on the records of our Grade 11 students on their high school ratings (GPA), grades in Science, Mathematics and English, NSAT or/and NCAE rating.

The above information is an integral part of my research for the degree of Master of Education in Teaching Physics at Philippine Normal University. The assistance your office can extend would be a great help on my thesis.

Thank you very much and hoping for your kind consideration.

Respectfully yours,

MERIAM ACUÑA-WALICAN

✓**Approved/Disapproved by:**

Priscila De Luna Manalang
School Officer In- Charge

Basic Data on Student's academic achievement in English, Mathematics, Science, GPA, and Scholastics Aptitude ratings

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
ENG6	100	78.00	93.00	86.2900	2.84017
ENG7	100	76.00	89.00	83.2700	2.65853
ENG8	100	76.00	89.00	83.5000	2.54852
ENG9	100	76.00	88.00	83.8000	2.62082
ENG10	100	78.00	88.00	83.9700	2.32881
ENG11	100	75.00	96.00	84.2300	5.80466
ENG	100	79.17	88.50	84.1767	2.08353
MATH6	100	78.00	94.00	86.2000	2.77434
MATH7	100	78.00	88.00	83.5700	2.45877
MATH8	100	76.00	90.00	83.6600	2.49128
MATH9	100	76.00	88.00	83.8600	2.45369
MATH10	100	77.00	89.00	84.2500	2.25350
MATH11	100	75.00	95.00	83.8000	4.70332
MATH	100	79.67	88.67	84.2233	1.85020
SCI6	100	80.00	93.00	86.5600	2.92091
SCI7	100	75.00	90.00	83.8600	2.96109
SCI8	100	76.00	91.00	84.0300	2.80496
SCI9	100	78.00	90.00	84.1700	2.46206
SCI10	100	78.00	91.00	84.5700	2.59080
SCI11	100	75.00	95.00	84.1800	5.82121
SCI	100	79.50	88.83	84.5617	2.22331
GPA6	100	78.00	94.00	87.2400	2.71963
GPA7	100	75.00	88.00	84.3800	1.95288
GPA8	100	76.00	89.00	84.3400	2.27955
GPA9	100	78.00	89.00	84.4400	2.10492
GPA10	100	78.00	89.00	85.0300	2.00734
GPA11	100	76.00	92.00	83.6600	4.43635
GPA	100	80.00	88.33	84.8483	1.65299
SA	100	396.45	800.00	640.5210	100.21655
RC	100	101.97	771.53	599.6933	100.94212
VA	100	184.22	771.52	625.0160	111.00271
MA	100	210.76	787.70	620.9178	138.94670
LRA	100	160.36	780.03	660.4136	99.27295
OGSA	100	300.25	857.40	540.0236	131.49628
PHYSICS	100	75.00	92.00	84.4100	3.83260
Valid N (listwise)	100				

Correlations

		PHYSICS	SEX	ENG6	ENG7	ENG8
PHYSICS	Pearson Correlation	1	-.176	.227*	.158	.058
	Sig. (2-tailed)		.080	.023	.117	.564
	N	100	100	100	100	100
SEX	Pearson Correlation	-.176	1	.025	-.306**	-.292**
	Sig. (2-tailed)	.080		.807	.002	.003
	N	100	100	100	100	100
ENG6	Pearson Correlation	.227*	.025	1	.141	.140
	Sig. (2-tailed)	.023	.807		.163	.164
	N	100	100	100	100	100
ENG7	Pearson Correlation	.158	-.306**	.141	1	.755**
	Sig. (2-tailed)	.117	.002	.163		.000
	N	100	100	100	100	100
ENG8	Pearson Correlation	.058	-.292**	.140	.755**	1
	Sig. (2-tailed)	.564	.003	.164	.000	
	N	100	100	100	100	100
ENG9	Pearson Correlation	.161	-.322**	.055	.586**	.744**
	Sig. (2-tailed)	.109	.001	.584	.000	.000
	N	100	100	100	100	100
ENG10	Pearson Correlation	.220*	-.289**	.082	.522**	.566**
	Sig. (2-tailed)	.028	.004	.416	.000	.000
	N	100	100	100	100	100
ENG11	Pearson Correlation	.749**	-.168	.193	.191	.159
	Sig. (2-tailed)	.000	.095	.055	.057	.115
	N	100	100	100	100	100
ENG	Pearson Correlation	.519**	-.318**	.402**	.707**	.731**
	Sig. (2-tailed)	.000	.001	.000	.000	.000
	N	100	100	100	100	100

Correlations

		ENG9	ENG10	ENG11	ENG
PHYSICS	Pearson Correlation	.161	.220*	.749**	.519**
	Sig. (2-tailed)	.109	.028	.000	.000
	N	100	100	100	100
SEX	Pearson Correlation	-.322**	-.289**	-.168	-.318**
	Sig. (2-tailed)	.001	.004	.095	.001
	N	100	100	100	100
ENG6	Pearson Correlation	.055	.082	.193	.402**
	Sig. (2-tailed)	.584	.416	.055	.000
	N	100	100	100	100
ENG7	Pearson Correlation	.586**	.522**	.191	.707**
	Sig. (2-tailed)	.000	.000	.057	.000
	N	100	100	100	100
ENG8	Pearson Correlation	.744**	.566**	.159	.731**
	Sig. (2-tailed)	.000	.000	.115	.000
	N	100	100	100	100
ENG9	Pearson Correlation	1	.749**	.226*	.743**
	Sig. (2-tailed)		.000	.024	.000
	N	100	100	100	100
ENG10	Pearson Correlation	.749**	1	.300**	.728**
	Sig. (2-tailed)	.000		.002	.000
	N	100	100	100	100
ENG11	Pearson Correlation	.226*	.300**	1	.684**
	Sig. (2-tailed)	.024	.002		.000
	N	100	100	100	100
ENG	Pearson Correlation	.743**	.728**	.684**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	100	100	100	100

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Correlations

		PHYSICS	MATH6	MATH7	MATH8	MATH9
PHYSICS	Pearson Correlation	1	.206*	.172	.203*	.254*
	Sig. (2-tailed)		.040	.087	.043	.011
	N	100	100	100	100	100
MATH6	Pearson Correlation	.206*	1	-.039	-.012	.028
	Sig. (2-tailed)	.040		.699	.906	.783
	N	100	100	100	100	100
MATH7	Pearson Correlation	.172	-.039	1	.736**	.650**
	Sig. (2-tailed)	.087	.699		.000	.000
	N	100	100	100	100	100
MATH8	Pearson Correlation	.203*	-.012	.736**	1	.663**
	Sig. (2-tailed)	.043	.906	.000		.000
	N	100	100	100	100	100
MATH9	Pearson Correlation	.254*	.028	.650**	.663**	1
	Sig. (2-tailed)	.011	.783	.000	.000	
	N	100	100	100	100	100
MATH10	Pearson Correlation	.131	-.032	.665**	.631**	.710**
	Sig. (2-tailed)	.195	.750	.000	.000	.000
	N	100	100	100	100	100
MATH11	Pearson Correlation	.754**	.283**	.120	.187	.243*
	Sig. (2-tailed)	.000	.004	.234	.062	.015
	N	100	100	100	100	100
MATH	Pearson Correlation	.537**	.358**	.706**	.738**	.768**
	Sig. (2-tailed)	.000	.000	.000	.000	.000
	N	100	100	100	100	100

Correlations

		MATH10	MATH11	MATH
PHYSICS	Pearson Correlation	.131	.754**	.537**
	Sig. (2-tailed)	.195	.000	.000
	N	100	100	100
MATH6	Pearson Correlation	-.032	.283**	.358**
	Sig. (2-tailed)	.750	.004	.000
	N	100	100	100
MATH7	Pearson Correlation	.665**	.120	.706**
	Sig. (2-tailed)	.000	.234	.000
	N	100	100	100
MATH8	Pearson Correlation	.631**	.187	.738**
	Sig. (2-tailed)	.000	.062	.000
	N	100	100	100
MATH9	Pearson Correlation	.710**	.243*	.768**
	Sig. (2-tailed)	.000	.015	.000
	N	100	100	100
MATH10	Pearson Correlation	1	.160	.708**
	Sig. (2-tailed)		.112	.000
	N	100	100	100
MATH11	Pearson Correlation	.160	1	.649**
	Sig. (2-tailed)	.112		.000
	N	100	100	100
MATH	Pearson Correlation	.708**	.649**	1
	Sig. (2-tailed)	.000	.000	
	N	100	100	100

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Correlations

		PHYSICS	SCI6	SCI7	SCI8	SCI9
PHYSICS	Pearson Correlation	1	.059	.259**	.253*	.179
	Sig. (2-tailed)		.562	.009	.011	.075
	N	100	100	100	100	100
SCI6	Pearson Correlation	.059	1	-.074	-.117	.037
	Sig. (2-tailed)	.562		.466	.247	.713
	N	100	100	100	100	100
SCI7	Pearson Correlation	.259**	-.074	1	.825**	.630**
	Sig. (2-tailed)	.009	.466		.000	.000
	N	100	100	100	100	100
SCI8	Pearson Correlation	.253*	-.117	.825**	1	.745**
	Sig. (2-tailed)	.011	.247	.000		.000
	N	100	100	100	100	100
SCI9	Pearson Correlation	.179	.037	.630**	.745**	1
	Sig. (2-tailed)	.075	.713	.000	.000	
	N	100	100	100	100	100
SCI10	Pearson Correlation	.140	.000	.596**	.658**	.775**
	Sig. (2-tailed)	.165	.999	.000	.000	.000
	N	100	100	100	100	100
SCI11	Pearson Correlation	.632**	.059	.429**	.366**	.337**
	Sig. (2-tailed)	.000	.561	.000	.000	.001
	N	100	100	100	100	100
SCI	Pearson Correlation	.459**	.211*	.798**	.793**	.787**
	Sig. (2-tailed)	.000	.035	.000	.000	.000
	N	100	100	100	100	100

Correlations

		SCI10	SCI11	SCI
PHYSICS	Pearson Correlation	.140	.632**	.459**
	Sig. (2-tailed)	.165	.000	.000
	N	100	100	100
SCI6	Pearson Correlation	.000	.059	.211*
	Sig. (2-tailed)	.999	.561	.035
	N	100	100	100
SCI7	Pearson Correlation	.596**	.429**	.798**
	Sig. (2-tailed)	.000	.000	.000
	N	100	100	100
SCI8	Pearson Correlation	.658**	.366**	.793**
	Sig. (2-tailed)	.000	.000	.000
	N	100	100	100
SCI9	Pearson Correlation	.775**	.337**	.787**
	Sig. (2-tailed)	.000	.001	.000
	N	100	100	100
SCI10	Pearson Correlation	1	.286**	.733**
	Sig. (2-tailed)		.004	.000
	N	100	100	100
SCI11	Pearson Correlation	.286**	1	.739**
	Sig. (2-tailed)	.004		.000
	N	100	100	100
SCI	Pearson Correlation	.733**	.739**	1
	Sig. (2-tailed)	.000	.000	
	N	100	100	100

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Correlations

		PHYSICS	GPA6	GPA7	GPA8	GPA9
PHYSICS	Pearson Correlation	1	-.010	.230*	.201*	.189
	Sig. (2-tailed)		.925	.021	.045	.060
	N	100	100	100	100	100
GPA6	Pearson Correlation	-.010	1	.040	-.088	-.033
	Sig. (2-tailed)	.925		.695	.383	.746
	N	100	100	100	100	100
GPA7	Pearson Correlation	.230*	.040	1	.681**	.598**
	Sig. (2-tailed)	.021	.695		.000	.000
	N	100	100	100	100	100
GPA8	Pearson Correlation	.201*	-.088	.681**	1	.775**
	Sig. (2-tailed)	.045	.383	.000		.000
	N	100	100	100	100	100
GPA9	Pearson Correlation	.189	-.033	.598**	.775**	1
	Sig. (2-tailed)	.060	.746	.000	.000	
	N	100	100	100	100	100
GPA10	Pearson Correlation	.218*	.010	.667**	.653**	.719**
	Sig. (2-tailed)	.030	.923	.000	.000	.000
	N	100	100	100	100	100
GPA11	Pearson Correlation	.724**	.071	.260**	.245*	.214*
	Sig. (2-tailed)	.000	.481	.009	.014	.032
	N	100	100	100	100	100
GPA	Pearson Correlation	.497**	.289**	.742**	.746**	.740**
	Sig. (2-tailed)	.000	.004	.000	.000	.000
	N	100	100	100	100	100

Correlations

		GPA10	GPA11	GPA
PHYSICS	Pearson Correlation	.218*	.724**	.497**
	Sig. (2-tailed)	.030	.000	.000
	N	100	100	100
GPA6	Pearson Correlation	.010	.071	.289**
	Sig. (2-tailed)	.923	.481	.004
	N	100	100	100
GPA7	Pearson Correlation	.667**	.260**	.742**
	Sig. (2-tailed)	.000	.009	.000
	N	100	100	100
GPA8	Pearson Correlation	.653**	.245*	.746**
	Sig. (2-tailed)	.000	.014	.000
	N	100	100	100
GPA9	Pearson Correlation	.719**	.214*	.740**
	Sig. (2-tailed)	.000	.032	.000
	N	100	100	100
GPA10	Pearson Correlation	1	.218*	.737**
	Sig. (2-tailed)		.029	.000
	N	100	100	100
GPA11	Pearson Correlation	.218*	1	.664**
	Sig. (2-tailed)	.029		.000
	N	100	100	100
GPA	Pearson Correlation	.737**	.664**	1
	Sig. (2-tailed)	.000	.000	
	N	100	100	100

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Correlations

		PHYSICS	SA	RC	VA	MA
PHYSICS	Pearson Correlation	1	.166	.180	.170	.067
	Sig. (2-tailed)		.099	.074	.091	.508
	N	100	100	100	100	100
SA	Pearson Correlation	.166	1	.086	.139	.115
	Sig. (2-tailed)	.099		.396	.168	.253
	N	100	100	100	100	100
RC	Pearson Correlation	.180	.086	1	.542**	.305**
	Sig. (2-tailed)	.074	.396		.000	.002
	N	100	100	100	100	100
VA	Pearson Correlation	.170	.139	.542**	1	.662**
	Sig. (2-tailed)	.091	.168	.000		.000
	N	100	100	100	100	100
MA	Pearson Correlation	.067	.115	.305**	.662**	1
	Sig. (2-tailed)	.508	.253	.002	.000	
	N	100	100	100	100	100
LRA	Pearson Correlation	-.155	-.052	.167	.356**	.407**
	Sig. (2-tailed)	.124	.608	.098	.000	.000
	N	100	100	100	100	100
OGSA	Pearson Correlation	-.025	.091	-.242*	-.217*	-.127
	Sig. (2-tailed)	.807	.368	.015	.030	.209
	N	100	100	100	100	100

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.888[a]	.789	.692	2.12555

a. Predictors: (Constant), OGSA, SCI9, MATH6, SA, VA, SEX, GPA11, LRA, ENG7, ENG6, RC, MATH7, GPA10, SCI6, ENG9, MA, GPA7, MATH11, MATH9, SCI7, GPA6, GPA8, ENG10, MATH8, GPA9, MATH10, ENG8, SCI10, SCI11, SCI8, ENG11

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1146.968	31	36.999	8.189	.000[b]
	Residual	307.222	68	4.518		
	Total	1454.190	99			

a. Dependent Variable: PHYSICS

b. Predictors: (Constant), OGSA, SCI9, MATH6, SA, VA, SEX, GPA11, LRA, ENG7, ENG6, RC, MATH7, GPA10, SCI6, ENG9, MA, GPA7, MATH11, MATH9, SCI7, GPA6, GPA8, ENG10, MATH8, GPA9, MATH10, ENG8, SCI10, SCI11, SCI8, ENG11

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	22.622	17.411		1.299	.198
	SEX	-.571	.585	-.075	-.976	.333
	ENG6	.174	.109	.129	1.599	.115
	ENG7	-.103	.140	-.072	-.736	.464
	ENG8	-.150	.177	-.100	-.845	.401
	ENG9	.280	.179	.191	1.559	.124
	ENG10	-.127	.178	-.077	-.711	.480
	ENG11	.421	.102	.637	4.111	.000
	MATH6	.011	.154	.008	.074	.941
	MATH7	-.122	.174	-.078	-.700	.486
	MATH8	-.037	.178	-.024	-.208	.836
	MATH9	.291	.163	.186	1.782	.079
	MATH10	-.403	.199	-.237	-2.024	.047
	MATH11	.447	.094	.549	4.763	.000
	SCI6	.045	.132	.034	.340	.735
	SCI7	-.059	.157	-.046	-.377	.707
	SCI8	.247	.200	.181	1.238	.220
	SCI9	-.017	.194	-.011	-.086	.931
	SCI10	-.278	.183	-.188	-1.521	.133
	SCI11	-.244	.090	-.371	-2.706	.009
	GPA6	-.191	.144	-.135	-1.322	.191
	GPA7	.246	.206	.125	1.195	.236
	GPA8	.105	.185	.062	.567	.573
	GPA9	.234	.210	.129	1.114	.269
	GPA10	-.078	.216	-.041	-.359	.721
	GPA11	.045	.144	.052	.314	.754
	SA	-.003	.003	-.071	-.997	.322
	RC	-.002	.003	-.062	-.789	.433
	VA	.002	.004	.063	.604	.548
	MA	.000	.003	.008	.079	.938

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	SEX	.528	1.894
	ENG6	.477	2.095
	ENG7	.327	3.056
	ENG8	.223	4.476
	ENG9	.207	4.841
	ENG10	.265	3.776
	ENG11	.129	7.726
	MATH6	.249	4.009
	MATH7	.250	3.992
	MATH8	.231	4.325
	MATH9	.285	3.514
	MATH10	.226	4.418
	MATH11	.234	4.272
	SCI6	.308	3.248
	SCI7	.212	4.721
	SCI8	.146	6.871
	SCI9	.199	5.016
	SCI10	.203	4.921
	SCI11	.165	6.049
	GPA6	.296	3.376
	GPA7	.282	3.546
	GPA8	.258	3.878
	GPA9	.233	4.288
	GPA10	.242	4.126
	GPA11	.112	8.920
	SA	.615	1.627
	RC	.509	1.963
	VA	.290	3.451
	MA	.335	2.983

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	LRA	-.002	.003	-.044	-.602	.549
	OGSA	.006	.002	.194	2.807	.007

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
	LRA	.582	1.717
	OGSA	.650	1.537

a. Dependent Variable: PHYSICS

Excluded Variables[a]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics	
						Tolerance	VIF
1	ENG	.[b]	.	.	.	.000	.
	MATH	.[b]	.	.	.	.000	.
	SCI	.[b]	.	.	.	.000	.
	GPA	.[b]	.	.	.	.000	.

Excluded Variables[a]

Model		Collinearity ...
		Minimum Tolerance
1	ENG	.000
	MATH	.000
	SCI	.000
	GPA	.000

a. Dependent Variable: PHYSICS

b. Predictors in the Model: (Constant), OGSA, SCI9, MATH6, SA, VA, SEX, GPA11, LRA, ENG7, ENG6, RC, MATH7, GPA10, SCI6, ENG9, MA, GPA7, MATH11, MATH9, SCI7, GPA6, GPA8, ENG10, MATH8, GPA9, MATH10, ENG8, SCI10, SCI11, SCI8, ENG11

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.842[a]	.709	.697	2.11052

a. Predictors: (Constant), OGSA, MATH11, ENG11, SCI11

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1031.034	4	257.758	57.868	.000[b]
	Residual	423.156	95	4.454		
	Total	1454.190	99			

a. Dependent Variable: PHYSICS

b. Predictors: (Constant), OGSA, MATH11, ENG11, SCI11

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	24.813	4.150		5.979	.000
	ENG11	.429	.067	.650	6.430	.000
	MATH11	.461	.073	.565	6.300	.000
	SCI11	-.208	.075	-.316	-2.779	.007
	OGSA	.004	.002	.151	2.643	.010

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	ENG11	.300	3.332
	MATH11	.381	2.627
	SCI11	.237	4.215
	OGSA	.938	1.066

a. Dependent Variable: PHYSICS

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions			
				(Constant)	ENG11	MATH11	SCI11
1	1	4.946	1.000	.00	.00	.00	.00
	2	.050	9.912	.00	.00	.00	.00
	3	.002	45.373	.75	.08	.00	.08
	4	.001	68.455	.12	.56	.56	.03
	5	.001	85.372	.13	.36	.44	.89

Collinearity Diagnostics[a]

Model	Dimension	Variance ...
		OGSA
1	1	.00
	2	.82
	3	.17
	4	.00
	5	.00

a. Dependent Variable: PHYSICS

Language and Style Editing Certification Form

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PREDICTORS OF PHYSICS PERFORMANCE AT MARHS

Prepared by

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Affiliation/Contact Number

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