

Predictors of the Actual Final Grade in Mathematics Subject of International Baccalaureate Diploma Programme Students in Surabaya, Indonesia

Arnel Macabuag¹, Edwin D. Ibañez²

¹Graduate Student, Department of Education and Related Studies, CLSU-Distance Online and Transnational University, Central Luzon State University Science City of Munoz, Nueva Ecija

²Faculty member, Department of Education and Related Studies, CLSU-Distance Online and Transnational University, Central Luzon State University Science City of Munoz, Nueva Ecija

ABSTRACT

This study tried to investigate what are the possible indicators of the performance of International Baccalaureate Diploma Programme Students taking Mathematics Standard Level in an international school in Surabaya. The research made use of secondary data gathered from the school such as the scores of the students and together with their profile. The data covered academic years 2014 – 2019. Other than the secondary data and information gathered from the administration office and curriculum coordinators, The researcher also gathered the progress scores of the students from their subject teachers, one of whom is yours truly. Descriptive-correlational research design was used to analyze the data. Data collected were analyzed and interpreted using frequency, percentage, mean, standard deviation and Pearson Product Moment Correlation. One-way Analysis of Variance was also used to check if there is significant difference among mock exam score for Predicted Grade (PG), General Point Average (GPA) and final grades. Among the socio-demographic characteristics of the respondents, only gender is significantly related to the final grade. Both GPA and mock exam predicted grades indicated that both grades have strong significant relationship to the final external examination grades of the students.

Keywords: Mock Exam, GPA, International Baccalaureate Diploma Programme, Mathematics Standard Level, Final Grade, Predicted Grade

INTRODUCTION

The International Baccalaureate (IB) is a non-profit organization that has been providing educational programs around the globe for fifty years. Introduced initially in the form of the Diploma Programme for students in the final two years of secondary school, the original aim of the IB was to provide a reputable and internationally transferable school qualification for expatriate, globally mobile families (Resnik, 2009). The IB has grown in popularity over the last few decades and is now offered in almost 5,000 schools in more than 150 countries (IBO, 2018c). Currently, the US has the largest number of IB schools in the world, followed by Canada. Together, these two countries account for 45% of all schools worldwide that

offer at least one of the IB programmes: Diploma Programme, Career-related Programme, Middle Years Programme and Primary Years Programme (IBO, 2018d).

There are numerous claims pertaining to the quality of the IB programmes made more often. First, IB programmes enjoy a positive reputation as rigorous, concept-driven, inquiry-based pedagogical frameworks that develop students' knowledge, academic/cognitive skills, attitudes and values (Ledger, 2017). According to Erickson (2008), concept-based learning allows students to form conceptually deeper understandings by analyzing, synthesizing and generalizing facts. Second, IB programmes are also considered by many to offer quantifiable academic preparation for university, lifelong learning, and life as a global citizen (Bunnell, 2015). Third, many parents believe IB programmes offer a rich curriculum while developing students' cultural fluency (MacKenzie, 2010) and ability to compete in a global market (Hayden, 2011). Furthermore, they are positively regarded by prestigious universities (Doherty, Luke, Shield, & Hincksman, 2012). Last, with rigorous academic preparation along with an emphasis on independent research, intercultural skills, community service and a philosophical/ethical component, IB programmes are seen as a "platinum standard" of education (Bunnell, 2015) and a welcome antidote to a narrow "back to basics" approach that has become common in many schools with the rise of standardized testing regimes (Dickson, Perry, & Ledger, 2017).

In Indonesia, there are 59 IB world schools offering the various programs ranging from Primary Years Program to Career Related Programs (IBO. 2020). The IB Diploma Program is gaining popularity despite the fact that the tuition fee in any IB school is comparably higher than those of other schools offering different international based curriculum. The quality and rigidity is always the top quality of the Diploma Program. IB program equips students with skills that are vital to success in university such as academic writing (Yudhi, 2014). Most of the IBDP graduates are expected to take up their university degree abroad like in Canada and United States. Some American and Canadian universities have higher chances of university acceptance and credited grades during their freshmen years especially if the grades are high.

The International Baccalaureate® (IB) Diploma Programme (DP) is an assessed programme for students aged 16 to 19. It is respected by leading universities across the globe (IBO, 2020). The DP students were better prepared for college on both academic and non-academic factors. Although analysis detected no differences in GPAs between groups, DP students who had completed four or more DP courses in high school were more likely to persist to complete college (Conley, 2014). It is because of the rigorous training not only in the content of the subject groups, but also the other facets that a student should hone. Each subject area has its own set of requirements that must be met aside from the examination. As one of my students said before, survive IB and the rest will be easy.

Zooming in the subject itself, Mathematics belongs to group 5 of the subjects that is being taken up. There is a review in the subject group of what needs to be improved in response to the ever evolving academic field worldwide. There were three tiers in Mathematics before. Each tier is designed is preparation for the university life that a student will be taking up as their course. The IB DP **higher level** mathematics course focuses on developing important mathematical concepts in a comprehensible, coherent and rigorous way, achieved by a carefully balanced approach (IBO, 2017). Higher level students are the students who have a very good foundation in Mathematics and will be taking up courses that requires

heavy calculations such as engineering. The IB DP mathematics **standard level** course focuses on introducing important mathematical concepts through the development of mathematical techniques. Standard level students should, wherever possible, apply the mathematical knowledge they have acquired to solve realistic problems set in an appropriate context. The IB DP **mathematical studies** standard level (SL) course focuses on important interconnected mathematical topics. It is designed to offer students with varied mathematical backgrounds and abilities the opportunity to learn important concepts and techniques and to gain an understanding of a wide variety of mathematical topics, preparing them to solve problems in a variety of settings, develop more sophisticated mathematical reasoning and enhance their critical thinking. Mathematical studies students lean more on the statistical area of mathematics as compared to the calculus for the higher level. Standard Level is in between the two tiers where it has the combination of both to certain extent.

As part of the assessment and grade awarding for the students, the IB central office requires the IB schools to submit the predicted grades of the students. Predicted grades which are derived by undergoing mock exams. Mock exams are a trial run which allow students to see where they need to improve ahead of their actual final exams (CTG, 2020). These predicted grades are also the ones which will be submitted to the universities abroad in advance because some of the universities requires the predicted grades as part of acceptance process and later on will be compared to the actual grades the students received in their final exam. Other than that, there is also the grade point average which is the record of the students' progress in the past 2 years as they undergo the diploma program.

The academic year 2019-2020 has been a big issue for the IBDP students worldwide. For the first time in the history of the IB Diploma Program the examination sessions were cancelled worldwide. This is due to the fact of the pandemic COVID 19 and since the examinations were scheduled in the month of May, it was the time when almost all countries implemented their own restrictions. Schools shifted to online sessions and because of this, the examination was cancelled. The IB central office came to an algorithm that will not require the examination results, but instead grades will be based on the predicted grades and the other coursework requirements in each of the subjects. The result was a huge difference from the predicted grade and many parents and students worldwide complained because of the "faulty" system that was implemented by the IB head office. For the academic 2020-2021, there are now two routes to be chosen for the grades to be determined: the examination route or the non-examination route (IBO, 2021). The examination route will make the students attend the school for a couple of weeks as they answer the examinations coming the central office scheduled late April to May 2021. These exams will then be distributed to the experts called examiners for marking. After which the grades will be given. The second option is the non-exam route, unlike the first route, no examination will be given but there are course works (paper works) from each subjects that must be submitted, other than that, an algorithm of school's historical performance of the students will be used to normalize the grade awarding. Both options were offered via survey to the different IB world schools across the globe. The route to be implemented per country depends on the capacity of the schools to implement the examination safely while following the standards examination procedure as well as the government approval. This year the decision for Indonesia is the non-exam route which is the same with Philippines, because of the COVID 19 still increasing as 2021 entered. In both routes, the predicted grade from the mock examinations and the course works will

be submitted to the IB central office and will be counter checked by their experts to validate the grades awarded by their respective subject teachers.

To validate the aims of the researcher whether the PG from the mock exams and GPA are enough to determine the final grade awarded by IB central office, the following objectives are to be carried out:

1. Seek out the socio demographic characteristics of the students under the study.
2. Calculate and present the frequency distribution, mean and standard deviation of GPA, PG for mock examination and the final grades of the students.
3. Compare and determine the relationship between the given variables of the study.

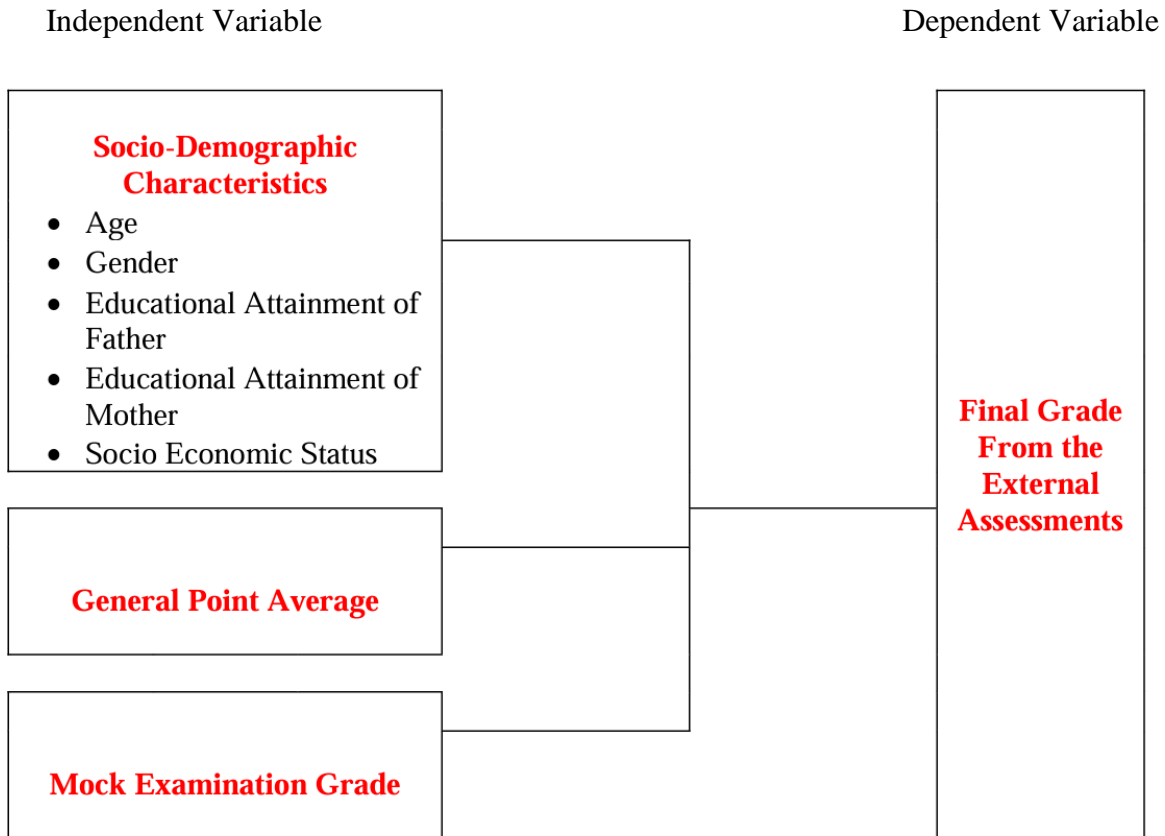
MATERIALS AND METHODS

The data required for this study was taken from the records of the admission office for the information about the parents. The other data needed were taken from the curriculum coordinator, with the permission that no names will be disclosed in the entire process of this paper.

In total, there are 177 students in this data coming from the different batches from academic year 2014 to 2019. It is also worth taking note that the grades in the data involves their GPA, Predicted grade from the Mock exam and their actual grade after their final external exam. It is also worth noting here that the grades are written from 1 to 7 but the boundaries as how a student gets 2 or 3 etc. are different in every academic year because these boundaries are adjusted to cater to the scores of the students on a yearly basis. Another important thing in relation to this paper is that the data under investigation is solely coming from the Mathematics Standard Level course only which is one of the tiers in Mathematics subjects. This is due to the fact that the standard level has the most number of students as compared to both higher and math studies. The final grades of the students are based on external examinations coming from the International Baccalaureate Head office. This external examination went through the approval of different academic experts of the IB before it will be delivered to the schools. The Mathematics standard level is consisting of 2 set of examination papers particularly paper 1 is a no calculator test and paper 2 is when calculator is allowed to use calculator. The final grade is calculated with 80% of the final grade coming from the examination and a coursework is 20% of the final grade of the students.

Statistical Package for Social Sciences (SPSS) was used for statistical computations of the gathered data. Descriptive statistics was employed to analyze the data regarding the socio-demographic characteristics of the students. This includes frequency, mean, percentages, and standard deviation. The Pearson's Product Moment Correlation (r) was used to determine the relationship between the students' predicted grades from their mock examination together with their general point average (GPA) as computed by their teachers including myself and their actual final grade from the International Baccalaureate central office. One way Analysis of Variance will also be utilized to check if there is significant difference among between GPA, Mock exam scores and the final grades.

Figure 1: Conceptual Framework Establishing the Relationship between Independent and Dependent Variable



The independent variables in this study are the socio-demographic characteristics which includes name the age, gender, educational attainment of father and mother. Data were taken from the registrar’s office of the school. The GPA and Predicted Grades (PG) records were taken from the subject teachers’ stored data which is kept by the curriculum coordinator. The dependent variable of this study is the final grade of the students. This is data is received by the school from the IB head office after the examination session is done and moderated. The same thing with the coursework. All papers will be marked by examiners called moderation. This n turn will determine the grade of the students.

RESULTS AND FINDINGS

A. Socio-Demographic Characteristics of the Respondents

To address the first objective of the study, socio-demographic characteristics of the respondents was discussed using mean, percentage and standard deviation. The following discussions were the findings about the age, gender, educational attainment of the father, and educational attainment of the mother of the students under the study. Data were taken from the registrar’s office of the international school in Surabaya, Indonesia.

Table 1 presents the socio-demographic characteristics of the respondents which include age, gender, educational attainment of the father and educational attainment of the mother.

Table 1: Respondent's Socio Demographic Characteristics

Socio Demographic Profile	Frequency n = 177	Percentage
Age	Mean = 18.03	SD = 0.391
17 years old	11	6.21
18 years old	150	84.75
19 years old	16	9.04
Gender		
Male	78	44.07
Female	99	55.93
Educational Attainment of Father		
College	119	67.23
Post Graduate	58	32.77
Educational Attainment of Mother		
College	140	79.10
Post Graduate	37	20.90

Age

The data showed that the age of the students under the study is between 17 to 19 years old. This is consistent to the fact that the IB Diploma program is for students ages 16 to 19 years old. The mean age of the students in their final year of the program is 18.03 and a standard deviation of 0.391. It is quite noticeable that the value of standard deviation is small which implies that the ages of the students are undispersed. In the final year of the Diploma Program, most of the students are in the age of 18 years which takes 84.75% of the total population of the students. There are also students aging 19 years' old which is 9.04% of the group, it is worth taking note that many of these 19 years are from outside the city of Surabaya and originally from abroad or from other major cities of Indonesia such as Kalimantan. One of the reason for transferring to Surabaya is due to lack of international school options in their hometown or their parents are working in Surabaya. There are also students who are 17 years old taking the 6.21% of the population. These students are the candidates who went to school at a very young age. Two of these 17-year old students skipped a level and enjoyed the privileges of being a scholar in the school. On the average, Indonesian students enter grade 1 at the age of 6 or 7 and finish the twelfth grade at the age of 18.

Gender

In terms of gender, there are more female students (99 or 55.93%) while there are 78 male students or 44.07% of the group. These values represent only the group of students who took up the Mathematics Standard Level of the IB Diploma Program of the school. The ratio is different from the other levels such as Higher level and the Math studies group although much fewer in number compared to Mathematics Standard Level, has more male students compared to female. In Indonesia, the Gender Parity Index as of 2018 is 0.99 which shows improving conditions between male and female schooling as compared to its previous years. (World Bank, 2018)

Educational Attainment of Fathers

It is worth noticing that in the data gathered, the educational attainment of the fathers is at least college graduates. 67.23% or 119 of the fathers are college graduates while 32.77% or 58 of them pursued postgraduate degrees. While it does not represent the entirety of the status of all parents in the country, the nature of the school having high tuition can only be afforded by families in the upper class of the family. The data also showed that specifically, most of the fathers have studied in countries such as Singapore and China as well as their post-graduate courses.

Educational Attainment of Mothers

Similar to the condition of the educational attainment of the fathers, all the mothers of the students indicated in the data showed that all are at least college graduates with some mothers having post graduate degrees. 140 or 79.1% of the mothers are college graduates and 37 or 20.9% of the mothers have post graduate courses. It is also worth noticing that despite of the small difference in terms of number of parents taking post graduate courses, many of the mothers despite the degree in college, are staying at home as housewife and some assume the responsibility of family businesses.

On Socio-Economic Status

While it is obviously noticeable that the data is skewed towards the upper class in terms of socio economic status, the data about monthly income was not available. The families enrolling in the school belongs to the upper class of Surabaya. Either the parents have an established businesses or the parents are contractors. Parents with high socio economic level understand the education process and know more about how to succeed in school. They are more attentive toward their children' learning activities and progress. They are more likely to motivate their children to obtain higher academic achievement (Jones, Bradbury, & Leboutillier, 2011). They also provide better access to books and other resources that support their children learning. Consequently, students from high socio economic status families generally possess higher confidence to manage challenges of academic life (Walpole, 2003). So for this study it is assumed that each family has the capacity to spend to bring out the best possible achievement for their children.

B. The Grade Point Average, Mock Examination Predicted Grade, and Final Grade

To attempt to answer the second objective of the study which is to present the data statistically, the grades of the students will be described using frequency, percentage, mean and standard deviation. The General Point Average as well as the Mock examination scores will be presented using table separately followed by the necessary interpretations.

The Grade Point Average (GPA)

Table 2 below shows the frequency distribution and percentage of the Grade Point Average (GPA) of the students in the Mathematics Standard Level of the school under the study. The table also shows that the mean GPA of the students is 4.5 with a standard deviation of 1.27. This shows that the scores are relatively close to one another. This may be because the scores from 1 to 7 have a range of values.

Table 2: Frequency and Percentage of Student's GPA in Math Standard Level

GPA	Frequency Mean = 4.5	Percentage SD = 1.27
7	18	10.17
6	28	15.82
5	51	28.81
4	53	29.94
3	20	11.30
2	7	3.95
1	0	0.00

As mentioned earlier the GPA is the overall progress of a student as they move forward in the diploma program. The two-year program is divided into 4 semesters and each semester is divided into two terms. Per term evaluation and assessments are then carried out to measure progress. Assessments given to students follows the standards that are expected to the final examinations. For Math Standard Level, the assessment is in the form of Papers 1 and 2. Paper 1 being non calculator type where students solve manually and only aided by a formula booklet. Paper 2 on the other hand is the test where they can use graphic display calculator together with the formula booklet.

Since the assessment is internal (within school), the school has the authority to change the percentages of the components to form the GPA. The range of grades is raised a little higher by the school than that of the actual IB standards. The purpose of this is for the students to be conditioned to aim higher score following the school standard and to lessen pressure while taking the final examinations. This implies that getting a high score internally is more difficult as compared to the range that the IB central office has determined. Table 3 below shows the sample grade boundaries as applied by the school within the progress in the Diploma Programme. Take note that this boundary is applied only for Mathematics subject exclusively. Other subject has their own boundaries to follow. Table 4 shows the applied grade

boundaries determined by the IB Diploma Program Head Office for the 2017 International Baccalaureate Diploma Program for Standard Level Mathematics.

Table 3: School Implemented Grade Boundary

Lower	Upper	Grade
90	100	7
75	89	6
65	74	5
55	64	4
37	54	3
19	36	2
0	18	1

Table 4: IB Grade Boundary for Mathematics Standard Level May 2017 session

Lower	Upper	Grade
83	100	7
73	82	6
62	72	5
51	61	4
38	50	3
19	37	2
0	18	1

It is quite noticeable the disparity from the awarding of grades from 3 to 7 for the students. Acquiring a 4 and above is more generous for the IB Diploma boundary. But once again the table 4 is applied to the combined scores from the final examination after the 2 years' program whereas the table 3 is from the progress and applied for each unit topics covered within the academic calendar.

As we can observe from table 2, of the 177 students in the study, 18 candidates or a total of 10.17% of the group received a grade of 7, often called as full marks. The batches of students vary every year; some group are better than the other in terms of performance. There are years where there are students getting the full marks but some years have none. Students who got a GPA of 6 has a total of 28 or 15.82% of the students who took Mathematics Standard level within the involved academic years. It is quite observable that students who got 6 are slightly higher than the ones who got full marks. This boils down how consistent the performance of the students is in class or if there are specific topics that the students are having a hard time usually the likes of calculus are the areas where the students struggled. 51 students or a total of 28.81% this shows that as the distribution of scores towards the mean, the bulkier the frequency to the scores. Students who get a grade 5 are average performers, these are the students who performed inconsistently and has particular topics where they struggle, together with the students who scored a grade of 4 consisting the total of 53 students or 29.94% of the students in the study, what sets apart the students scoring a 4 and a 5 is quite minimal but their grade holds the biggest chunk of the distribution. There are 20 or 11.3% of the students who get a grade of 3 these are the students who has the minimal skills in the

subject but did not fully excel. Lastly there are receives a grade of 2 with a frequency of 7 or 3.95% of the 177 students in the study. These students are ones who rarely exerted efforts despite the interventions made by the teachers. No student received a grade of 1 because this implies that if a student received a grade of 1, he or she did not do anything in class.

Generally speaking, the GPA of the students was quite good. To pass in the Mathematics standard level course in IBDP standard, a student must get a grade of at least 3. It is a must to reiterate that the GPA was computed using average of the topical tests and various assessments within the span of the academic program. Since GPA is counted by using a combination of summative and formative assessments, the main foundation of the formative assessments is the feedback that is given to students to help them be aware of the gaps in their learning aims (Boston,2002). This means that the students will have a time to adjust on what needs to be improved in the areas where they struggle so that they can perform better for the Mock exams and the final examinations. Summative tests are also necessary and administered once in every term and semester. Term exams covers at least chapters of the material while semester exams are at least 5 chapters depending on the length of the topics.

The Mock Examination Score

Mock examination as a formative assessment criterion also acts as a fallback in case of a need to predict early university intake or investigate any suspicions or malpractice in the final examinations. Mock therefore as an assessment tool, must meet the guidelines on examination procedures to ensure reliability. (Andala,Digolo,Kamande,2014). As mentioned above, the Mock Examination score serves as the predicted grade that will be submitted by the school to the IB Head Office.

Table 5 below shows the distribution of the grades of students from their Mock Examination which is then labeled as predicted grades. Just like the GPA, the grades are scored from 1 to 7 following the school's grade boundary. The table is described using the mean grades, frequency from each score, percentage of each grade, and standard deviation. The mean grade of the students in the mock exam is 4.46 and the standard deviation of 1.16. This implies that since the standard deviation is quite low, their scores are not scattered and it clutters around the mean.

Table 5: The Predicted Grade of Students from the Mock Exam

PG	Frequency Mean = 4.46	Percentage SD = 1.16
7	6	3.39
6	31	17.51
5	42	23.73
4	63	35.59
3	30	16.95
2	4	2.26
1	1	0.57

The mock examination which is done a few months before the actual final examinations as part of continuous assessment has been used as a measure of performance of the students prior the actual final external exam. It is the closest as the actual test itself since all the standards and protocols of the actual exams are executed the very same way. Mock examinations are used to gauge what level student are working such that any teacher who pays attention to the student should use the mock to have an idea of what the student would get in main exams. Another significant importance of the mock exams is that since predicted scores are generated from it, and the results of the actual final examinations will take a long time to be released, the scores from these exams are used for university acceptance such as United States and Canada. Mock examinations help the students to overcome nervousness and will almost certainly ensure a higher mark in the real examination (Caulley, 2008). This is the reason why even as early as the mock exams, the students pay significant time to prepare for every material of their subjects.

Table 5 shows that there are 6 students or 3.39% of the 177 students get a grade of 7 in the predicted grade from the mock exam. 31 students or 17.51% of students received a predicted grade of 6, There are 42 students or 23.73% of the students who received a grade of 5, 63 or 35.59% of students received a grade of 4. The number of students who received a grade of 3 is 30, making up 16.95% of the group. While 4 students received a grade 2 which is 2.26% of the group and lastly 1 student received a predicted grade of 1 which is 0.57% of the group.

In general, it is quite similar to that of the GPA but at a lower degree. This is quite understandable because the mock exam compressed the 2 years of learning into 2 papers with at least 10 questions each. There is too much content for the students to master all in a short period of time of preparation.

The Actual Grades from the Final Examination

The external examinations of the International Baccalaureate Diploma Program for Mathematics Standard Level is made up of two sets of papers. This test is taken on two different days. The final exam is composed of at least 10 questions divided into two parts. Table 6 shows the frequency distribution of the grades of the students. It is described by using the frequency of each grades, the mean and standard deviation as well the percentage of each grades the student received.

Table 6: The Final grades of the students from the External Examination

Grade	Frequency Mean = 4.53	Percentage SD = 1.20
7	11	6.21
6	24	13.56
5	54	30.51
4	51	28.81
3	32	18.08
2	5	2.83
1	0	0

The table above shows that there 11 students or 6.21 students receiving a grade of 7. There are 24 students who received a grade of 6 who composes the 13.56% of the group. 54 students or 30.51% of the students received a grade of 5. 51 students of 28.81% of the group received a grade of 4. On the other hand, the students who received a grade of 3 has a frequency of 32 or 18.08% of the group and 5 students or 2.83% received a grade of 2. No student received a grade of 1.

The results are noticeably higher than that of the GPA and mock exam grades because of the different grade boundary that was applied in the external exam. These boundaries are determined by the International Baccalaureate Organization. A sample of grade boundary from IB is the table 4 from above.

C. The comparison of Mock Exam Scores, Grade Point Average and Final Exam Grade

In order for the comparison to occur and for ease of referencing, table is 7 is made. This table shows the percentage distribution of the scores of the students. The scores will also be compared using means and standard deviation.

Table 7: Comparison of GPA, Mock Exam Grade and Final Exam in Distribution in Percent

Grade	GPA	Mock Exam	Final Exam
7	10.17	3.39	6.21
6	15.82	17.51	13.56
5	28.81	23.73	30.51
4	29.94	35.59	28.81
3	11.30	16.95	18.08
2	3.95	2.26	2.82
1	0.00	0.56	0.00

It is worth noticing that the students had a decline from GPA scores to Mock exam scores. Comparing the 10.17% dropping to 3.39% of GPA grades to mock exam scores of students getting a grade of 7. This can be explained by the increase of students getting a 6 in mock exam which is 17.51% as compared to the 15.82% of GPA. There is also a decrease from GPA score for students with a grade of 5, from 28.81% dropping to 23.73%. Students receiving a grade of 4 in GPA is way lower compared to students receiving a 4 in Mock exam, the score is 29.94% of GPA to 35.59% in the mock exam. There is also a lower percentage of students getting a 3 in GPA which is 11.3% while 16.95% of students received a grade of 3 in the Mock exams. A grade of 2 from GPA is 3.95% of the group is a little higher compared to the Mock exam which is only 2.26%. Finally, no student received a grade of 1 form the GPA while 0.56% from the Mock exam score was recorded.

To include in the comparison, the final grade of the students, we must first consider that the grade boundaries are different. A sample of such grade boundaries were presented in tables 3 and 4. The students who got a grade of 7 slightly increase from mock exam score to final grade, from 3.39% to 6.21%, this may be explained to the feedback coming the mock exams and the remaining time to prepare for the actual exam. There was a decrease of percentage for the getting a grade of 6, from 17.51% to 13.58%. An

increase in percentage of students getting a 5 from mock exam (23.73% to 30.51% of the actual exam. This might be explained by the possibility that some students who scored a grade of 4 was pulled up to 5. It is worth seeing that there was a decline of student percentage getting a grade of 4 from the mock exam to final exam. A grade of 3 also increased form the mock examination to final examination from 16.95% to 18.08% Students with a grade of 2 is also slightly different as the mock exam scores had 2.26% while the final examination grade has 2.82%. This can be explained by the fact that there is no student who received a grade of 1.

However, when we talk about the mean and standard deviation comparison, all three scores have almost the same mean and standard deviation. The mean for GPA is 4.46, The mock exam has 4.5 while the final exams has 4.53. All the three means are the same when the these are rounded in 2 significant figures. The standard deviation on the other hand differs by a very small portion. Standard deviation for GPA is 1.27, while for the mock exam is 1.16 and the final exam examination is 1.2. All of which are still close to one another, all meaning the same thing, that the scores are close to each other since the all the standard deviations are small values.

Relationship between the Socio-Demographic Characteristics and Final Grades

Table 8 shows the relationship between the socio-demographic characteristics cited and the final grades in mathematics standard level of the students in the study. To determine the relationship between the socio-demographic characteristics and final grades, a correlation using Pearson r was computed.

Table 8: Correlation between the Socio Demographic Characteristics and the Final Grades of students in Mathematics standard level

Socio Demographic Characteristic	Final Grade	
	r	p-value
Gender	0.2001*	0.007
Age	0.0653	0.388
Father's Educational Attainment	0.0961	0.203
Mother's Educational Attainment	0.007	0.931

Legend: * significant at $p < 0.01$

Results shown in this study that gender revealed a weak positive correlation to the final grade of the students ($r=0.2001$, $p \text{ value} < 0.01$). This may imply that although significant, it may play very little role in the achievement of grades whether male or female. This may have been contradicted by the data on hand because by referring to the table below, the number of female students getting the higher grades is higher than those of male.

Table 9: Gender Distribution of Final Grades Among IB Math SL Students

Grade	Male	Female
7	2	9
6	8	16
5	24	30
4	25	26
3	17	15
2	4	1
1	0	0

By looking at the table above, it is quite easy to say that the female dominated the better scores. Such occurrences may have been due to the fact that there are more female students compared to the male students. However, in Nigeria, Abiam and Odok (2006) stated that there is no significant relationship between gender and achievement in numbers, numeration, algebra and statistics, but there is weak significant relationship in areas such as trigonometry and geometry. These claims supported the findings in the study since Mathematics Standard level is spiraling in nature, the areas mentioned are part of its syllabus.

Other than gender which is significantly weak related to final grade, other socio demographic indicators such as parent’s educational attainment and age are not significantly related to the students’ final grade. This maybe explained that the students are virtually of the same degree because all their parents are at least college graduate, earning big amount in terms of salary and at the same time the student’s age bracket are not scattered.

Relationship between the GPA, Mock Examination Grade and Final Grades

To answer the third objective of the study, one-way Analysis of Variance is applied to test if there is significant difference among the three variables. Table 10 shows the summary of Analysis of Variance test.

Table 10: One way ANOVA summary between Mock Exam Grade, GPA, and Final Grade

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	6.43	2	3.22	2.20	0.112	3.01
Within Groups	771.94	528	1.46			
Total	778.38	530				

The table above shows that there is no significant difference between the means of the variable. This may be explained by the close value of its means and standard deviation. This means that we accept the null hypothesis since p value is greater than 0.1. On the other hand, the table 11 below shows the relationship of mock exam score and the final grade as well as the relationship between mock exam grade and the final grade of the students of Mathematics Standard Level of IB Diploma Programme.

Table 11: Correlation between the GPA and Mock Exam Score to Final Grade

Predictors	Relation to Final Grade	
	r	p Value
GPA	0.871	0.00
Mock Exam Score	0.810	0.00

As seen on the table above, both GPA and Mock Exam score are positively significant correlated. GPA has a Pearson coefficient of determination is 0.871 with p value of 0. This implies that GPA score is a strong predictor in relation to final examination grade. This also means that the better GPA a student has in his/her semester scores, the better the final grade is expected.

The same is observed with the mock exam score in relation to the final grade of students who take up IB Math Standard Level. The coefficient of determination is $r = 0.810$ with p value of 0. This means that there is a strong positive relationship between Mock examination and final grade. Dotson (2010) claimed that the demonstration of the effectiveness of the mock exam sessions presents evidence that educational supports containing components that have been effective at improving multiple-choice exam performance can also be effective at improving performance on short essay exams requiring more complex, application-based answers. It follows that that students performing better in the mock exams are most likely to perform better in the final examination. This is because of the fact that the conditioning from the mock examination simulating the standard protocol of the actual exam makes the students get used to the examination condition. Since there is also enough time for revision form the time of mock examination and the actual test, then students have gained enough adjustments towards the exam type questions.

CONCLUSION

On the basis of the findings, the following conclusions were drawn:

1. There more female students who took up Mathematics Standard Level, the age are mostly 18 years old and both of their parents are at least college level. This implies that all students have the financial capacity to avail all the possible support to attain better grades.
2. In terms of grades from GPA, Mock Exam PG and Final Grades, the mean and standard deviation from each set of grades are almost close to each other.
3. There is no significant difference among the means of GPA, Mock Exam scores and the Final grades of the students. This is explained by the small value of mean among all variables.
4. Among the socio demographic characteristics of the students, only gender is significantly correlated to the final grade, weak positively correlated to be precise. This may be explained by more number of female students compared to male students. More female received higher grades compared to male students.
5. Both GPA and Mock Examination scores have strong significant positive correlation to Final examination grades.

RECOMMENDATIONS

From the findings and conclusion, the following recommendations are offered:

1. The other tiers of Mathematics students should be considered. This means that the Higher level and Math studies be counted to get the complete picture of the Mathematics scores if there are differences or similarities.
2. The other components of grades such as course works are to be considered. This might have some influence in the actual grade because it bears some percentage of weight in the grades.
3. To be able to check the values further, the inclusion of the other tiers must be considered. This is to further verify if there will be difference due to more sample being introduced
4. The study can be extended to other IB world schools if the findings in terms of gender will be validated. It is worth comparing results from different IB world Schools.
5. For the situations where the final examination cannot be held, it is worth looking to give significant look at the GPA and Mock exams as predicted grade and later on be confirmed by the International Baccalaureate Head office with some evidences and proofs coming from school. This year and the academic year 2020 sessions there was no IB exam for some countries such as Indonesia and Philippines die to COVID19 pandemic. The algorithm set by IB should count both GPA and mock examinations with proper evidences coming from the respective schools.

REFERENCES

1. Abiam, P.O. & Odok, J. K. (2006). Factors in students' achievement in different branches of secondary school mathematics. *Journal of Education and Technology*, 1(1), 161-168.
2. Digolo, Andala, H.O., & Kamande, M. (2014). Reliability of Mock Examinations for Prediction of the Kenya Certificate of Secondary Examination (KCSE) Results, *IOSR Journal of Research and Methods in Education*.
3. Boston, C. (2002). The concept of formative assessment. *Practical Assessment, Research & Evaluation*, 8.
4. Bunnell, T (2008) The global growth of the International Baccalaureate Diploma Programme over the first 40 years: A critical assessment. *Comparative Education* 44(4): 409-424.
5. Bunnell, T (2015) The rise and decline of the International Baccalaureate Diploma Programme in the United Kingdom. *Oxford Review of Education* 41(3): 387-403.
6. Capitaltuitiongroup.com. 2021. *Mock Exams 2020/21: More Important Than Ever*. [online] Available at: <<https://capitaltuitiongroup.com/tpost/5kp7f6i6s1-mock-exams-202021-more-important-than-ev>> [Accessed 5 March 2021].
7. Caulley, D. N. (2008). Book Review: Realistic Evaluation. *Evaluation Journal of Australasia*, 8(1), 60–62.
8. Conley, David PhD, McGaughy, Charis PhD, Davis-Molin, Whitney, Farkas, Rachel and Fukuda, Erin; International Baccalaureate Diploma Programme: Examining college readiness; The Education Policy Improvement Center. July 2014
9. Dickson A, Perry LB, Ledger S. Impacts of International Baccalaureate programmes on teaching and learning: A review of the literature. *Journal of Research in International Education*. 2018;17(3):240-261.
10. Dickson A, Perry LB, Ledger S. How accessible is IB schooling? Evidence from Australia. *Journal of Research in International Education*. 2017;16(1):65-79. doi:10.1177/1475240917696037
11. Doherty, Catherine & Luke, Allan & Shield, Paul & Hinckman, Candice. (2012). Choosing your niche: The social ecology of the International Baccalaureate Diploma in Australia. *International Studies in Sociology of Education*. 22. 10.1080/09620214.2012.745346.
12. Dotson, W.H. (2010). Investigating the variables in a mock exam study session designed to improve student exam performance in an undergraduate behavior modification and therapy course.
13. Erickson, H. L., (2008). *Stirring the Head, Heart, and Soul: Redefining Curriculum, Instruction, and Concept-Based Learning*. Thousand Oaks, CA: Corwin Press
14. Erickson, H. L. (2012). Concept-based teaching and learning. IB position paper. The Hague: International Baccalaureate Organisation. Retrieved from http://www.ibmidatlantic.org/Concept_Based_Teaching_Learning.pdf
15. Hayden, M., & Thompson, J. (Eds.) (2011). *Taking the IB Diploma Programme Forward*. John Catt Educational Ltd.
16. International Baccalaureate®. 2021. *Education programmes*. [online] Available at: <<https://www.ibo.org/programmes/>> [Accessed 26 February 2021].
17. Ibo.org. 2018. *Inquiry-based teaching and learning: An efficacy study in International Baccalaureate schools*. [online] Available at:

- <<https://www.ibo.org/contentassets/aec3ab0a46c844cb98842066f7c69a8c/rfp-inquiry-efficiency-2018-en.pdf>> [Accessed 28 February 2021].
18. *Studies* 57 (3): 217–44.
 19. IB Organization, 2021. *Update for May 2021 Diploma Programme and Career-related Programme examination session*. [online] International Baccalaureate®. Available at: <<https://www.ibo.org/news/news-about-the-ib/further-update-for-may-2021-diploma-programme-and-career-related-programme-examination-session/>> [Accessed 3 March 2021].
 20. Jones, P., Bradbury, L., & Le, B. S. (2011). *Introducing social theory*. Cambridge, UK: Polity Press.
 21. MacKenzie P. School choice in an international context. *Journal of Research in International Education*. 2010;9(2):107-123.
 22. Resnik, Julia. 2009 “Multicultural Education—Good for Business but Not for the State? IB Curriculum and the Global Capitalism.” *British Journal of Educational*
 23. Walpole, M. (2003). Socioeconomic Status and College: How SES Affects College Experiences and Outcomes. *Review of Higher Education: Journal of the Association for the Study of Higher Education*, 27(1), 45–73.
 24. World Bank Blogs. 2021. *Gender and education in Indonesia: Progress with more work to be done*. [online] Available at: <<https://blogs.worldbank.org/eastasiapacific/gender-and-education-indonesia-progress-more-work-be-done>> [Accessed 11 February 2021].
 25. Yudhi, Benjamin (2014), *Sistem Edukasi SMA di Indonesia: Manakah yang harus kamu ambil?* Retrived March 8, 2021 from <http://indonesiamengglobal.com/2014/04/sistem-edukasi-sma-di-indonesia-manakah-yang-harus-kamu-ambil/>