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## Admission Requirements and Academic Performance of Learners in Higher Education Institution

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### Abstract

Higher education institutions (HEIs) require specific admission criteria to select the best candidates for a particular program. This study aimed to assess the admission requirements and academic performance of the board and non-board course learners. Specifically, this quantitative study utilized a descriptive-correlational research design. The data came from randomly selected third-year college students in the different board and non-board programs enrolled in the academic year 2020-2021. There were 286 respondents who took part in the study, 153 from the board course program, Bachelor of Science in Elementary Education, and 133 from the non-board course program, Bachelor of Science in Information Technology. The data revealed that the most number of enrollees in the non-board course, BSIT is from the Technical-Vocational-Livelihood (TVL) strand, while most learners from the board course, BSEE belong to the General Academic Strand (GAS). Further, findings showed that the high-school grade point average and the college academic performance of students from the non-board course, BSIT, were moderately correlated, and a similar relationship is observed for the variables on college admission test and GPA. Meanwhile, for the board course, BSEE, admission tests, and high-school GPA were predictors of college academic performance. On the other hand, high-school strands were not predictors of the BSEE student's GPA. In conclusion, the college admission tests and high-school GPA are essential admission requirements for the board and non-board programs to predict academic performance. However, the high-school strand can be a determining factor for the academic performance for the non-board course, but not for the board course.

*Keywords:* Admission requirements, academic performance, strand, and board and non-board course

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## Introduction

Can rigorous admission requirements in Higher Education Institutions (HEIs) select the best candidates for a particular program? Although several HEIs mandate specific admission criteria such as high-school general point average (GPA), university aptitude test result, and the like, there are still no standard requirements for tertiary education today. In the K to 12 curricula, there are additional requirements like the senior high school (SHS) strands and the Alternative Learning System education. However, at this study's locale, as state HEI, it is observed that several SHS graduates prefer to enroll in a program that is not aligned with the track/strand/education taken in their secondary level. Although the Commission on Higher Education (CHED) observed this scenario, the agency has directed all HEIs to accept senior high school graduates regardless of the strand/track/education taken (CMO 105, s. 2017). In response, HEIs identified various admission requirements for board and non-board courses. As observed, board courses have more stringent admission requirements than non-board courses. Thus, it is crucial to evaluate what specific requirements match students' academic performance.

Various literatures revealed that admission criteria are indicators to predict academic performance (Valli, Balakrishnan, Ching, Latiff, & Nasirudeen, 2014). The available evidence suggests that pre-admission criteria are set to help enroll students with the highest standards that are more likely to succeed in the field (de Visser, Fluit, Cohen-Schotanus, Laan, 2018; Kelly, Patterson, O'Flynn, Mulligan, Murphy, 2018; Patterson, Knight, Dowel, Nicholson, Cousins, Cleland, 2016). Specifically,

other studies revealed that high-school grade point average and standardized test scores significantly predicted students' success during their undergraduate studies (Noble, 2000). Similarly, McDonald (2000) observed that high school GPA more accurately predicts academic success in college than standardized tests or any other factor. Also, College Aptitude Test scores and high school GPA were positively and significantly related to students' academic performance (Johnston, 2006). However, other studies on the predictive validity of entrance test scores suggested that academic success was enhanced by using entrance test scores (Johnston, 2006). The results of the studies explained the students' admission requirements as determinants of academic performance.

In addition to the mentioned criteria, other foreign higher education institutions require students to finish a preparatory year before enrolling in their selected colleges (Alamoudi, Fallatah, and Eldakhakhny, 2021). After completing all the preparatory year courses, students can then apply to their desired colleges if their GPA meets the requirements of the preferred college. This scenario is similar to the senior high educational system in the Philippines. Students are assessed at the secondary level and prepared to be proficient when they reach the tertiary level. However, it has been a concern whether the preparatory year courses appropriately equip the learners with the required competencies needed for a particular tertiary course.

Although literature and studies have established a relationship between admission criteria and the students' academic performance, most inquiries focused on foreign admission practices, and few institutional studies pursued evaluating the identified variables. Moreover, the

evaluation of the SHS track became an essential variable that needs to be assessed thoroughly, whether these types of education meet the program qualification. Hence, the need to look into the K to 12 strand/track is vital, whether these are significant predictors of learners' academic performance. Aside from that, it is essential to compare admission requirements among board and non-board courses to get a picture of the students' performance holistically.

This study intended to examine the board and non-board course entry qualifications as predictors of students' academic performance in college. Determining the relationship between SHS strand, SHS GPA, admission test, and academic performance, may provide insights in terms of enhancement of the secondary education system as a preparatory program for higher education courses. Therefore, this study served as a basis for evaluating student admission to higher education institutions regardless of changes in the educational system. This research is vital to determine the type of support that SHS graduates would need upon their transition to higher education in the new normal, especially those enrolled in a program that is not aligned with the strand taken in SHS.

### **Framework of the Study**

The study was anchored on Walberg's theory of educational productivity (1981) and the vertical alignment theory of Kurz, Talapatra, & Roach (2012). Walberg's theory of educational productivity tackles the influences on learning that affects the academic performance of students. The theory states that there are factors that affect the performance of students in school, namely ability or prior achievement, development, motivation, the quantity of

instructions, home environment, school environment, peer group, and mass media (Frazer, Walberg, Welch, & Hattie, 1987). In the recent context, the first three variables (ability, motivation, and age/development) reflect the characteristics or internal traits of the students. These factors would include their aptitude, ability, and intelligence quotient, as well as previous achievement, motivation or self-concept, and chronological age including development and stage of maturation. The fourth and fifth variables focus on instructional factors (quantity and quality). Quantity of instruction is described as the number of times students engage in learning including the time scheduled, allowed, or assigned for a given instructional unit by the teacher, as well as the fraction of this time students actually spend learning the content. The quality of instruction, includes the psychological and curricular experiences and can be seen as the appropriateness of the instructional experience.

The final four variables (classroom climate, home environment, peer group, and exposure to media) represent aspects of the psychological environment. Classroom climate refers to the classroom as a social atmosphere while the home environment denotes the support given to students while at home. Peer group experience refers to how well students get along with each other outside of the school environment and their exposure to mass media variable is the minimum leisure-time spent on television viewing and the reading of books or magazines. Walberg argued that these variables have certain effects that might influence the academic performance of students. Further, Walberg's theory of academic achievement posits those psychological characteristics of individual students and their immediate psychological milieus impact educational outcomes in

terms of their cognitive, behavioral, and attitudinal aspects (Reynolds & Walberg, 1992).

On the other hand, the vertical alignment theory assumes a clear, direct, and linear relationship between the concepts transferred to learners at different levels of the learning process (Kurz, Talapatra, & Roach, 2012). The theory assumes that the learners who take a vertically aligned curriculum exhibit better learning outcomes (Kagan, Carroll, Comer, & Scott-Little, 2006). A vertically aligned curriculum is designed to provide students with lessons and courses to prepare them for progression to the next education level. The theory proposes that teaching is structured purposefully and sequenced logically so that students will learn the knowledge and skills that progressively prepare them for a more rigorous and higher level of work (Kurz et al., 2012). On this note, the vertical alignment theory argues that the misalignment between senior high strands and college courses is a phenomenon that could disrupt the learning progression of the students. The learning progression perspective contends that there must be a purposeful sequencing of teaching and learning expectations across multiple developmental stages, ages, or grade levels.

The learning progression is the standard that described each education level and was intended to address specific learning needs and abilities of the students at a particular stage of their intellectual, emotional, social, and physical development. In this regard, the misalignment between senior high strand and college courses affects these standards leading to poor cognitive, psychomotor, and affective learning dimensions (Alipio, 2020). The theory claims that students exposed to vertically misaligned curriculum tend to score low in the assessment, and experience

multiple psychological dilemmas, including the inability to adjust, and exhibit poor help-seeking behavior.

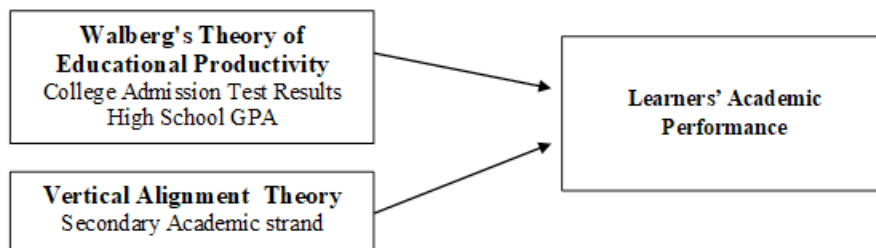
In application, this theory of Walberg can describe the need for cognitive development to progress in higher education institutions. This explains why college admission test is vital in determining the academic success of learners. The quality of instruction during senior high school can be measured using the college entrance tests administered prior to admission to a specific HEI program. The theory further asserts that curricular experiences at the secondary level can affect the academic performance of learners regardless of high school strand. In contrast, Kurz, Talapatra, & Roach (2012) believe that vertical alignment is crucial for learners to exhibit better learning outcomes. It has been postulated that a vertically aligned curriculum is fundamental for students' academic success. The theory proposes that if teaching is structured purposefully and sequenced logically learners will acquire knowledge and skills honing them for a more rigorous and higher level of work. The vertical alignment theory believes that the misalignment between senior high strands and college courses could disrupt the learning progression of the students. Harmonizing the two theories revealed variables that are important considerations for assessing the admission requirement and academic performance of students in higher education institutions. Further, the study assumes that educational stand, SHS grades, and admission test results serve as essential tools for the acquisition and eventual success of learning as shown in Figure 1.

## **Objectives**

The study aimed to assess the

## Figure 1

*The Interplay of Variables in the Study.*



admission requirements and the academic performance of the board and non-board course learners. Specifically, it sought to: (1) determine the profile of the board and non-board course learners in terms of secondary academic strand, secondary general point average (GPA), and college admission test result, (2) evaluate the relationship between learners' admission requirements and their academic performance, and (3) identify which requirements affect the academic performance of the board and non-board course learners.

### Research Design

The study is a quantitative study utilizing a descriptive-correlational research design. A descriptive method describes the learners' admission requirements and academic performance, while the correlational design assesses the relationship between academic performance and admission criteria of the board and non-board course learners.

To evaluate the admission requirements, pertinent data were retrieved from the concerned offices in the university, after securing prior consent from identified students. Specifically, the student's academic track (Senior High School strand) record and the senior high school GPA were taken from their respective colleges. Moreover,

college admission test results were sourced from the University Testing Center while the Office of the University Registrar provided the program-specific subject GPA excluding academic performance during the summer/midyear term. This study covered two (2) academic years (AY 2018-2019 and 2019-2020) equivalent to four (4) semesters. Initial assessment indicated one (1) board course, Bachelor of Science in Elementary Education, and one (1) non-board course, Bachelor of Science in Information Technology as the focused setting of the study. The inclusion of the program was based on the availability and completeness of data.

### Respondents

The respondents of the study were third-year students who are the pioneer batch of the K- to-12 curriculum. Only two programs were included in this study specifically Bachelor of Science in Information Technology (BSIT) for the non-board course and Bachelor of Science in Elementary Education (BEE) for the board course. The selection of the program for a non-board course followed the criteria as listed: a) program curriculum includes skill-based subjects; b) accepts enrollees with varied K-to-12 tracks; c) has more

than 100 student population; and, d). respondents with complete grades from two (2) academic years (AY 2018-2019 and 2019-2020). For board-course the following criteria were observed: a) has more than 100 student population; b). respondents with complete grades from two (2) academic years (AY 2018-2019 and 2019-2020); c) the program does not have a specific specialization; and d) accepts enrollees with varied K-to-12 tracks. The number of participants was determined using Slovin's formula. There were 286 respondents, 153 from the board course BEE, and 133 from the non-board course BSIT. A random sampling technique was further used to determine respondents. The respondents were third-year college students from the different board and non-board programs enrolled in the academic year 2020-2021 with complete grades for the period 2018 to 2020.

### **Statistical Analysis**

The study used descriptive statistics, specifically frequency distribution, that describes the learners' admission requirements such as their respective strand, general point average, and their academic performance. This research utilized the Department of Education (DepEd) grading system to categorize the respondents' SHS grades. Meanwhile, the "passed", "on-probation," or "failed" status were the categories of the College Admission Test results. The level of measurement for the strand is nominal while for the GPA, the level of measurement is the interval (scale level). In obtaining the association between these two data sets (variables), the test used is the beta coefficient since the two variables are nominal and scale levels, respectively. Multiple regression analysis using the step-

wise method was used to identify which admission requirements affect the academic performance of the learners, while a stepwise regression method was employed to determine specific independent variables. Further, for nominal variables, a code was assigned known as the dummy variables 0-1 to process multiple regression analysis for this type of data.

### **Limitations of the Study**

This study examined the board and non-board course entry qualifications to predict students' academic performance. The academic performance was measured using the general average grades of the major subjects for two (2) academic years (AY 2018-2019 and 2019-2020). To ensure uniform measurement of the dependent variables, academic performance and board performance were excluded since a non-board course was considered in the study. Further, data analysis included only a determination of the relationship between admission requirements and academic performance of the board and non-board courses. This study does not intend to compare courses. The discussions on the relationship between entry qualifications and academic performance were presented according to the course.

### **Ethical Considerations**

This study adhered to the ethical requirements of the university. Strict compliance with all ethical guidelines was observed as the study involved students' personal data. The study sought approval from concerned colleges, students, and Research Ethics Committee. With the constraints brought about by the COVID-19 pandemic, the distribution of the consent

forms to the students was done through the college social media (Facebook) page. The information posted on the said pages contained the general background of the study, objectives, methodology of the data gathering, and contact details of the researchers. Also, the post included information about the use of the learners' personal data once they agreed to participate in the study. In the consent form, there was an emphasis on the necessary statement regarding voluntary participation, approval to retrieve academic records (SHS strand, GPA, and admission test result), withdrawal clause, and other ethical considerations. Participants who will explicitly signify their objection to joining the study will be excluded. The researchers also explained to the participants that one (1) month after the study information posting, they could withdraw as participants of the study anytime. Overall, the process of obtaining the data followed the suggestions provided by the University Research Ethics Committee. The participants' names and personal data were not divulged in this research to ensure the participants' privacy, confidentiality, anonymity, and safety.

In terms of the strand, most of the learners belong to the TVL (60.2%;  $f=80$ ), while few belong to ABM tracks (3%;  $f=4$ ). Table 1 shows that the likelihood of TVL strand graduates taking up BSIT is higher

than that of the other strand. In terms of the College Admission Test result, the STEM strand significantly has the highest mean scores of 49.81 (SD 9.93), and those who took the ABM strand have the lowest mean scores of 37.27 (SD 8.20). For the high-school GPA, the HUMSS strand obtained the highest mean GPA of 91.39 (SD 2.11), while the ABM strand got the lowest mean GPA of 86.81 (SD 1.08).

The data show that enrollees in the non-board course, BSIT, mostly come from the TVL strand. The result indicated compliance with the provision of the Department of Education's K to 12 program which recommends that learners who wish to enroll in technology courses must take the technology and livelihood education (TLE) and Technical-Vocational-Livelihood (TVL) track in high school (Department of Education, 2019). It is, therefore, expected that more learners from the TVL strand will enroll in BSIT, as this strand provides preparatory competencies for students who will enroll in technology courses. In a similar study by Alamoudi, Fallatah, Eldakhakhny (2021), foreign higher education institutions also require their students to finish a preparatory year and must obtain a GPA set by the college program before admission for better academic performance.

In relation to the admission test mean scores, many (97%) BSIT students obtained

**Table 1**

*Track Strands, Admission Test and High School GPA of Respondents*

Track/Strand	Frequency	Percent	Mean Admission Test	SD	Mean HSGPA	SD
TVL strand	80	60.2	40.57	7.21	89.08	3.53
GAS strand	30	22.6	40.73	8.04	89.01	3.18
HUMSS strand	5	3.8	45.82	10.98	91.39	2.11
ABM strand	4	3.0	37.27	8.20	86.81	1.08
STEM strand	14	10.5	49.81	9.93	89.96	2.88
<b>Total</b>	<b>133</b>	<b>100.0</b>				

**Table 2***Board Course: BEE Profile*

Track/Strand	Frequency	Percent	Mean Admission Test	SD	Mean HSGPA	SD
TVL strand	22	14.4	44.75	4.62	90.90	2.59
GAS strand	89	58.2	45.92	4.90	91.21	2.69
HUMSS strand	26	17.0	48.74	6.20	91.83	2.67
ABM strand	7	4.6	47.40	2.70	89.70	3.06
STEM strand	9	5.9	48.89	9.24	92.28	2.15
Total	153	100.0				

scores of more than 40%, and few (3%) ABM strand students had scores under probationary status. These data revealed that most BSIT students passed the admission test. However, the program provided opportunities for some students to enroll despite the probationary scores. According to Briggs (2009), the college admission test measures educational development in terms of English, mathematics, reading, writing, science, critical thinking, and problem-solving. That is why higher education institutions measure students' entry competencies in four (4) areas: English, mathematics, science, and abstract reasoning. Undeniably, students who were on an academic track like STEM would achieve better entrance exam results than the other strands. These are some of the limitations of most admission tests as it only measures four areas, without considering the multiple intelligences of students. Thus, the need to provide a better opportunity for students to be admitted into their desired course is essential.

Table 2 illustrates the frequency distribution of an HEI board course, Bachelor of Science in Elementary Education. In terms of the SHS track, most of the learners belong to the General Academic Strand (GAS) (58.2%;  $f=89$ ). There were few respondents who belonged to the Accountancy, Business, and

Management (ABM) strand as indicated in the frequency count, 7 ( $f=4.6\%$ ). It is observed that the Science, Technology, Engineering, and Mathematics (STEM) strand has the highest mean of College Admission Test Results while those who took the GAS and Technical-Vocational-Livelihood (TVL) strands have the lowest mean scores of 45.92 (SD 4.90) and 44.75 (SD 4.62), respectively. In terms of High-school GPA, STEM learners have a high mean GPA of 92.28 (SD 2.15), and the ABM learners have a low mean GPA of 89.70 (SD 3.06).

Table 2 data revealed the probability of GAS strand graduates taking up Bachelor of Science in Elementary Education is higher compared to other tracks. According to Brillantes, Orbeta, Francisco-Abrigo, Capanes and Jovellaros (2019), learners who took up the GAS strand were undecided on which track to take. These students were given electives from other academic strands to prepare them for the courses they would like to take in college. However, Brillantes et al. (2019) emphasized that those students who planned to take up humanities and social science-related courses in college such as journalism, communication arts, liberal arts, and education can choose the Humanities and Social Sciences (HUMSS) strand. The HUMSS strand focuses on improving students' communication skills,

which is essential for learners who want to take up Bachelor of Science in Education.

Also, STEM and HUMSS learners exhibited a high average mean admission test result compared to other strands. This finding implies that some academic high school strands provide a better advantage on entrance exams that test learners' science, mathematics, vocabulary, and abstract thinking. Thus, the high school strand contributes to learners' selection of higher education board courses. The study of Malaga and Oducado (2021) further supported that the strand or track of students in senior high school influences their academic self-regulated learning and performance.

### Learners' Academic Performance (GPA)

Table 3 depicts the mean and standard deviation used to describe the academic performance of the BEE and BSIT students. According to Basri, Alandejani, and Almadani (2018), the GPA reflects the students' academic performance and present state of knowledge and skills. Based on the BukSU Registrar Manual of Operations (2019), the descriptive values of the college GPA were the following: 90% and above, outstanding; 85%-89%, very satisfactory;

80%- 84%, satisfactory; 75%-79%, fairly satisfactory; 74% and below, did not meet expectations. For board course BEE, the majority of the students obtained an "outstanding" mean GPA of 90% and above. Specifically, the STEM strand obtained the highest mean equivalent to 92%, ( $M = 1.66$   $SD = 0.11$ ), next is the HUMSS strand equivalent to 91% ( $M=1.72$ ,  $SD = 0.15$ ), third is the ABM strand with ( $M=1.73$   $SD = 0.11$ ), followed by GAS ( $M= 1.76$ ,  $SD = 0.15$ ), and lastly TVL strand with a mean equivalent to 90% ( $M=1.79$ ,  $SD = 0.14$ ). The result displays that despite varied strands, the BEE students showed an "outstanding" GPA, with figures that were more concentrated and closer to the mean accuracy score. The data further disclosed that the board course, BEE, attracted learners with outstanding performance in college. The BEE has stringent entry requirements with an "outstanding" to a "very satisfactory" high-school GPA and above 40% admission test result. It can be surmised that board course learners perform better academically irrespective of their high-school strand.

On the other hand, students enrolled in the non-board course, BSIT, garnered a "very satisfactory" mean regardless of their strand. As observed, the STEM strand had

**Table 3**

*General Point Average of Board Course and Non-Board course*

Track/Strand: BEE	Mean GPA	SD
TVL strand	1.79	0.14
GAS strand	1.76	0.15
HUMSS strand	1.72	0.15
ABM strand	1.73	0.11
STEM strand	1.66	0.11
Track/Strand: BSIT	Mean GPA	SD
TVL strand	1.97	0.18
GAS strand	2.04	0.18
HUMSS strand	1.91	0.18
ABM strand	2.14	0.15
STEM strand	1.87	0.20

**Table 4***Relationship between GPA and HSGPA, CAT, and Strand/Track*

Variables	Pearson's r	p-value	Eta coefficient
BSIT			
GPA and HSGPA	-.487	.000	GPA and
GPA and CAT	-.491	.000	STRAND/TRACK

the highest mean equivalent to 89% ( $M = 1.87$ ,  $SD = 0.18$ ), and the ABM strand had the lowest mean equivalent to 86% ( $M = 2.14$ ,  $SD = 0.15$ ). The result revealed that the BSIT students, who came from different strands, attained a “very satisfactory” GPA, with results nearer to the mean score of the group. Interestingly, the ABM strand learners from BSIT have an average GPA of 2.14 compared to other strands. Engadin (2019) defined Accountancy Business and Management (ABM) as a senior high school strand that focuses on the basic concepts of financial management, business management, and corporate operations. Therefore, the ABM strand is mismatched to technology courses like BSIT, affecting the student's academic performance. Thus, enrolling in an aligned preparatory track is essential to skill-based courses like BSIT.

#### ***Learners' Admission Requirements and Their Academic Performance***

Table 4 presents the statistical data to determine the possible relationship between

the grade point average (GPA) and the variables: HSGPA, college admission test (CAT) result, and the senior high school strand /track of a non-board course, BSIT.

Among the BSIT students, the high school GPA and academic performance (college GPA) were moderately correlated, at  $r(132) = .487$ ,  $p < 0.005$ . Interestingly, the exact relationship was observed for the variables CAT and GPA as reflected in the computed values of  $r(132) = .491$ ,  $p < 0.005$ . The results imply that if the students' high school grade point average (GPA) and CAT score were high, their college GPA was also high. Although it was negatively correlated, it was due to the different grading systems of DepED and BukSU. DepEd's highest score is 100%, while BukSU's highest grade is 1.0. In addition, there was a weak association between GPA and high school strand at  $\eta = .303$ ,  $\eta^2 = .0918$ . Further, the students' strand only contributed 9.18% to the college GPA. Other variables not included in this study may contribute to the learner's academic performance.

Table 5 reveals that there is the same

**Table 5***Relationship between GPA and HSGPA, CAT, and Strand/Track*

Variables	Pearson's r	p-value	Eta coefficient
BEE			
GPA and HSGPA	-0.472	.000	GPA and
GPA and CAT	-0.350	.000	STRAND/TRACK

degree of correlation among BEE high school and college GPA as reflected in the computed values of  $r = .472$ ,  $p < 0.0050$ . In addition, there is a positive correlation between the CAT and the GPA ( $r = .350$ ,  $p < 0.0050$ ). Thus, the identified relationship of the variables may indicate that the BEE students' HS GPA and CAT results were likely to affect college academic performance. As HSGPA and CAT increase, an increase in the students' GPA is also expected. In terms of the strand and GPA, a weak association existed at  $\eta = .201$ ,  $\eta^2 = .040$  indicating that differences in the BEE student's GPA could be attributed to the students' high school strand type by 4.00%. Similar studies on the possible association of admission requirements with the academic achievement of students corroborated the findings presented in this study (Tiffin et al., 2016; Yousafzai & Jamil, 2019). Mufti (2014) confirmed the positive correlation between admission test and academic performance, while Rajandran (2014) posited that high school grades strongly correlate with college academic performance. The senior high school strand, recently introduced as a possible predictor of college academic performance was the focus of the study of Magbag (2020), where results indicated that the senior high school strand could influence the GPA of college students. Hence, admission requirements could affect the academic performance of the board and non-board course learners.

A study conducted by Canque, Derasin, and Pinatil (2021) observed that academic achievement and senior high school track/strand had a significant relationship to the college GPA. This implies that students' college performance is influenced by their high school background in which their skills and academic potential are honed making them ready for college education.

Moreover, the result supports the finding of Zwick and Sklar (2005) and Geiser and Santelices (2007) that high school GWA is a solid predictor of college grades. Likewise, Sawyer (2010) and Bridgeman et al. (2008) articulated that performance in senior high school is a valid predictor of undergraduate academic performance and provides an accurate prediction of future academic performance. Thus, students with better achievement in senior high school are more likely to perform academically in college.

The inclusion of high school GPA and college admission test must be considered by higher education institutions in the Philippines as the primary requirement for admission. If appropriate college entry requirements are enforced to meet the needs of every program/course these will yield better academic performance and a higher retention rate in college. For board courses, a stringent admission evaluation on HSGPA and admission test scores must be implemented to capture students who are academically prepared for licensure examinations.

### ***Requirements that Affect the Academic Performance of the Board and Non-board Course Learners***

Using SPSS, a multiple regression analysis was conducted to check whether CAT, HSGPA, and STRAND/TRACK predicted the GPA of students where each of the individual strands is treated as the reference group. Succeeding tables show the estimation of the standard deviation of the model and the variation analysis.

### **Non-Board Course**

Table 6 presents the estimation of the standard deviation of the model for both

board and non-board courses. The result shows that 36% of the total variance of the independent variable is explained by the predictor and the computed figures in Table 7 indicate that the model was a significant predictor of GPA ( $F=36.521$ ,  $p<0.05$ ). Furthermore, the academic requirements, which include strands, high school GPA, and college admission test are factors, which have a significant effect on academic performance based on the learners' GPA in the non-board course (BSIT).

The study result is similar to Garton, Dyer, and King's (2000) findings that both high school GPA and admission test results have a positive association with learners' academic performance. In the same context, Geiser and Santelices (2007) observed that high-school GPA is consistently the strongest predictor while admission test remains a factor in learner's academic performance. On the other context, the senior high-school strand has a significant association with the learners' academic

performance (Alipio, 2020). Also, Canque, Derasin and Pinatil (2021) believed that pre-college skills and intellectual abilities must be strong enough to assist students to face challenges in college. This study posits that high school strands can provide a strong foundation for learners to be ready to handle academic challenges in tertiary education.

These findings suggest that academic requirements like HSGPA and college admission test, can contribute to learners' academic performance. This implies that selecting the best learners to meet the requirements of every program relies on a thorough evaluation of the cognitive admission requirements. This further implies that identifying the best candidates for admission increases the HEIs productivity in terms of the overall academic performance of the students. The HSGPA and admission tests provide educators with a complete idea of each student's potential for success in college.

**Table 6**

*Model Summary - Estimation of Standard Deviation*

R	R square	Adjusted R	R	Standard Error of the Estimate
.600	.360	.350		.22359

Predictors: Constant, STRANDS, HSGPA (centered), BukSUCAT (centered)

**Table 7**

*ANOVA Variation Analysis*

**Table 7. ANOVA – Variation Analysis**

	Sum of Squares	Degree of Freedom	Mean Square	F	p-value
Regression	3.652	2	1.826	36.521	.000
Residual	6.499	130	0.050		
Total	10.151	132			

Table 8 presents the statistical findings with regards to determining the predictive values of the variables HSGPA, CAT and senior high school STRAND/TRACK on the academic performance of the BSIT students as reflected in the GPA. Based on the nonstandard coefficients, the following regression equations were formulated:

Based on the nonstandard coefficients, we obtained the following regression equations.

$$\hat{y} = 2.066 - 0.014x_1 - 0.028x_2$$

where  $y$  = predicted GPA,  $x_1$  = CAT rating (centered), and  $x_2$  = high school GPA (centered).

As gleaned from the presented data in Table 8, both the predictors' CAT (centered) ( $B=-0.008$ ,  $p<.05$ ) and HSGPA (centered) ( $B= -0.020$ ,  $p<0.05$ ) are significant predictors of the model GPA. It means that for every unit increment in CAT rating and HSGPA, the conditional mean for GPA increases by 0.014 and 0.028, respectively. Studies on the predictive value of admission exam results and secondary education grade point average on the students' academic performance yielded similar results providing further support to this study's findings (Sulphey, Al-Kahtani, & Syed, 2018; Dutt, & Krishnakumar, 2017).

In terms of admission tests, the study concurs with the same notion posited by Evans (2012) and O'Connor and Paunonen

(2007) stating that students with high scores on standardized aptitude and admission tests are most likely to succeed academically. Rigney (2003) provided a supportive argument to the previously cited findings, concluding that students with high scores in the standardized eligibility scores performed better in school. However, a number of studies also revealed a weak link between eligibility scores and the overall academic performance (Feldman, 2005; McIntosh & Munk, 2007). In fact, some studies found no relationship between standardized eligibility test scores and academic success (Sulphey, 2010; McIntosh & Munk, 2007). Moreover, Smithers et al. (2004) found that the effectiveness of the standardized admission test to predict future performance diminishes beyond the second year of study. Although entrance aptitude tests, high school GPA, and college performance revealed inconclusive and often conflicting results from previous studies, this present investigation revealed that aptitude test (CAT), high school GPA, and some strands can predict students' academic performance in non-board courses.

The present study showed that the college GPA of learners are not significantly affected by the type of strand/track in their secondary level of education. This result is contrary to the findings of Alipio (2020), and Magbag and Raga (2020) stating that

**Table 8**

*Non-Board Course: BSIT Regression Coefficients*

Variable	Unstandardized B	Coefficients Standard Error	Standardized Coefficients Beta	t	p-value
Constant	2.066	.019		106.559	.000
CAT Centered	-.014	.002	-.410	-5.566	.000
HSGPA Centered	-.028	.006	-.322	-4.509	.000

$F(2,130)=36.521$ ,  $R^2 = .360$ ,  $p<.005$

**Table 9***Model Summary - Estimation of Standard Deviation*

R	R square	Adjusted R	R	Standard Error of the Estimate
.498	.248	.236		.17099

Predictors: Constant, STRANDS, HSGPA (centered), BukSUCAT (centered)

the senior high school strand predicts academic performance. Alipio (2020) further believed that the senior high school strand contains subjects that prepare the students for their careers in college and industry. Similarly, Magdadaro (2020) found out that having an ideal strand offers learners a sense of self-assurance and can propel students to be passionate about their chosen careers. Ideally, DepED created K to 12 curriculum to develop holistic and well-prepared learners equipped with 21st-century skills in preparation for their preferred higher education course. Nevertheless, the high school strand by itself did not predict academic performance. These observations may be attributed to the reported inadequate facilities in public schools, where classrooms, teachers, laboratories, workshops, equipment, and tools cannot meet the development of learners in each strand (Asian Development Bank and Department of Education of the Government of the Philippines, 2019). These cited inadequacies may have contributed to insufficient strand implementation that may not prepare learners for the college

program of choice, yielding no bearing on students' tertiary preparation.

**Board Course: BSEE**

For the Board course, BSEE, a multiple regression was conducted to check whether CAT, HSGPA, and STRAND/TRACK predicted the GPA of students where each of the individual strands is treated as the reference group. The following tables show the estimation of the standard deviation of the model and the variation analysis.

Table 9 shows the model summary of the board course, BSEE, where the predictors explained a significant amount of variation in the value of GPA as reflected in Table 10 ( $F(2,120)=19.807$ ,  $p<.05$ ,  $R^2=.248$ ). The value of  $R^2$  means that 24.8% of the variation of GPA of board course (BSEE) is explained by the independent variable: strand, high-school GPA, and CAT. According to Pike and Saupe (2002), grade point average (GPA) has been a primary indicator of academic performance and an established method for determining if learning has occurred. In a similar context, Gomez (2017) observed that GPA demonstrates

**Table 10***ANOVA - Variation Analysis*

	Sum of Squares	Degree of Freedom	Mean Square	F	p-value
Regression	1.158	2	0.579	19.807	.000
Residual	3.509	120	0.029		
Total	10.151	122			

learning and an individual's readiness to transition into adulthood. Similar to the findings in the non-board course, BSIT, high school GPA of students is an essential enrolment requirement to predict the BSEE students' academic performance.

According to Pike and Saupe (2002), grade point average (GPA) has been a primary indicator of academic performance and an established method for determining if learning has occurred. In a similar context, Gomez (2017) observed that GPA demonstrates learning and an individual's readiness to transition into adulthood. Similar to the findings in the non-board course, BSIT, high school GPA of students is an essential enrolment requirement to predict the BSEE students' academic performance.

Moreover, statistically generated figures implied that the admission test, and CAT, predicts students' academic achievement. As gleaned from the study by Mascolo, Alfonso, and Flanagan (2014), assessment test helped measure students' learning and could be an important method for guiding instructional practices. Further, Golding and Donaldson (2006) emphasized the importance of standardized assessment scores as predictors of academic performance. Also, Harackiewicz, Tauer, Barron, and Elliot (2002) found out that

high school GPA and standardized assessment scores significantly predicted short- and long-term GPA. Respondents' previous academic work and standardized assessment scores predicted their academic performance in a college setting. These studies provided substantial support to the findings that high school GPA and admission requirements are essential predictors of students' academic achievement.

Further, Table 11 indicated the non-board course: BEE regression coefficients, while Table 12 displayed the ANOVA-variation analysis. Based on the nonstandard coefficients, the following regression is obtained:

$$\hat{y} = 1.891 - 0.031x_1 - 0.007x_2$$

where  $y$  = predicted GPA,  $x_1$  CAT rating (centered), and  $x_2$  = high school GPA (centered). Both the variables CAT (centered) ( $B = -0.005$ ,  $p < .05$ ) and HSGPA (centered) ( $B = -0.022$ ,  $p < .05$ ) are significant predictors to the model GPA. The constant 1.891 indicates that the average GPA of a BEE student falling to the grand means of CAT rating and HSGPA, respectively, is 1.891. The computed values for the variable, CAT rating ( $B = -0.031$ ,  $p < .05$ ), imply that for a 1-unit increment in the CAT rating of

**Table 11**

*Non-Board Course: BEE Regression Coefficients*

Variable	Unstandardized B	Coefficients Standard Error	Standardized Coefficients Beta	t	p-value
Constant	1.891	.015		122.644	.000
CAT Centered	-.031	.006	-.428	-5.279	.000
HSGPA Centered	-.007	.003	-.176	-2.173	.032

$F(2,120)=19.807$ ,  $R^2 = .248$ ,  $p < .005$

a student, the corresponding GPA increases by 0.031. On the other hand, the predictor HSGPA ( $B=-0.007$ ,  $p<.05$ ) indicates that for a 1-unit increment in the HSGPA, the student's college GPA increased by 0.007.

This finding is similar to the observations of Burton and Ramist (2001), that the combination of standardized tests and high school GPA yield significant contribution to first-year GPA, cumulative college GPA, as well as graduation. The study clearly showed that high school GPA and admission test results are two important entry enrolment requirements contributory to students' academic performance. Furthermore, all strands treated as the reference group are found to be not significant predictors of GPA for the board course, Bachelor of Science in Elementary Education. In contrast, Malaga and Oducado (2021) emphasized the need for college programs to consider the academic strands of students in senior high school when admitting students to a particular program. Also, Alipio (2020) states that K to 12 curricula prepares students for their career in college and industry, yet, pointed out that students may take a college degree that is not aligned with the strand taken in senior high school.

The data show that the academic strand is not a predictor of the academic achievement of students from a particular board course. However, this finding cannot generalize all board courses since it only reflects a particular program of interest. A thorough evaluation of this matter needs to be done to further assess whether the high-school strand contributes to students' preparation and performance in higher education.

Further, the findings of the study affirm Walberg's theory of educational productivity. In the said theory, curricular experiences at the secondary level can

affect the academic performance of learners regardless of the high school strand. Cognitive factors such as entrance exams and HSGPA clearly contributed to the college academic achievement of learners. However, the findings do not complement the theory of vertical alignment where the HS strand is not observed to be a predictor of students' academic success. This study posits that misalignment between senior high strands and college courses could not disrupt the learning progression of the students and could not affect their academic performance.

The findings affirm the Commission on Higher Education's memorandum allowing all learners regardless of their strand to enroll in their preferred courses. However, this may offer a new perspective to all HEIs that offer bridging programs. The need for learners to enroll in a bridging program is not essential, illustrating that specific tracks could not affect the academic performance of learners. This study shows that any learner can enroll in college programs regardless of their HS strand. Moreover, better academic performance was observed among board and non-board course learners with high HSGPA and Admission Test results. Thus, stringent admission requirements on HSGPA and Admission Test are crucial in ensuring better academic performance among learners in board course programs.

## **Conclusion**

The study concluded that admission requirements affect the academic performance of learners. Specifically, college admission tests and high-school GPA are predictors of academic performance in both board and non-board courses. High school strand as an entry requirement is not a determining factor for a board and non-board-course students' academic performance.

## Recommendations

1. The Commission on Higher Education (CHED) may look into the findings of this study as a basis for a policy review on HEI admission requirements, specifically on the inclusion of senior high school track in admission requirements.
2. Higher education institutions may consider other variables not captured in the standardized entrance exam to measure whether the students' competencies match the requirements set by the program. The institution may consider the multiple intelligences of learners to provide a better opportunity for students to be admitted to their desired course.
3. A college/program may not require specific strands as a requirement for admission into a particular course. The need for a bridging program to prepare the students for their chosen course is no longer essential.
4. Other researchers may consider other courses and variables not considered in this study.

## References

- Alamoudi, A. A., Fallatah, H. I., Eldakhakhny, B. M., Kamel, F. O., AlShawwa, L. A., & Elsamanoudy, A. Z. (2021). Relationship between admission criteria and academic performance in basic science courses in health science colleges in KAU. *BMC Medical Education*, 21(1). <https://doi.org/10.1186/s12909-021-02502-4>
- Alipio, M. (2020). Academic adjustment and performance among Filipino freshmen college students in the health sciences: Does senior high school strand matter? <https://doi.org/10.35542/osf.io/xq4pk>  
Asian Development Bank and Department of Education of the Government of the Philippines. (2019). Youth education investment and labor market outcomes in the Philippines: Survey report. Manila. <https://development.asia/insight/factors-affecting-senior-high-school-track-offerings-philippines>
- Basri, W. S., Alandejani, J. A., & Almadani, F. M. (2018b). ICT adoption impact on students' academic performance: Evidence from Saudi universities. *Education Research International*, 1–9. <https://doi.org/10.1155/2018/1240197>
- Bridgeman, B., Pollack, J., & Burton, N. (2008). Predicting grades in different types of college courses. *Ets Research Report Series*, 1, i–27. <https://doi.org/10.1002/j.2333-8504.2008.tb02092.x>
- Briggs, D. C., & Weeks, J. P. (2009). The impact of vertical scaling decisions on growth interpretations. *Educational Measurement: Issues and Practice*, 28(4), 3–14. <https://doi.org/10.1111/j.1745-3992.2009.00158.x>
- Brillantes, K. B., Orbeta, A. C., Francisco-Abrigo, K. A., Capones, E. M., & Jovellanos, J. B. (2019). Status of senior high school implementation: A process evaluation. <https://pidswebs.pids.gov.ph/CDN/PUBLICATIONS/pidsdps1913.pdf>
- Burton, N.W., and Ramist, L. (2001). Predicting success in college: SAT studies of classes graduating since 1980 (College Board Research Report 2001-02) New York: The college board. <http://mc-3241-129741632.us-east-1.elb.amazonaws.com/sites/default/files/publications/2012/7/researchreport-2001-2-predicting-college-success-sat-studies.pdf>
- Canque M., Derasin L., & Pinatil L. (2021). Senior high school background and GPA of the education students in

- a state university in the Philippines. *Turkish Journal of Computer and Mathematics Education*, 12(13), 3560-3566
- De Visser, M., Fluit, C., Cohen-Schotanus, J., & Laan, R. (2018). The effects of a non-cognitive versus cognitive admission procedure within cohorts in one medical school. *Adv Health Sci Educ Theory Pract.*, 23(1):187–200.
- Dutt, S., & Krishnakumar, K. (2017). Gender and academic achievement in engineering colleges, *International Journal of Engineering Research & Technology*, 6(6) <http://dx.doi.org/10.17577/IJERTV6IS060456>
- Engadin, C. (2019). Accountancy, business and management (ABM) strand. Edukasyon.ph. Retrieved on July 23, 2019 from <https://www.edukasyon.ph/courses/senior-high-tracks/academic-business-and-management-strand>
- Evans, V. (2012). Cognitive linguistics. *WIREs Cognitive Science*, 3(2), 129–141. <https://doi.org/10.1002/wcs.1163>
- Feldman, D. C. (2005). The food's no good and they don't give us enough: Reflections on Mintzberg's critique of MBA education. *Academy of Management Learning & Education*, 4(2), 217–220.
- Fraser, B. J., Walberg, H. J., Welch, W. W., & Hattie, J. A. (1987). Syntheses of educational productivity research. *International Journal of Educational Research*, 11(2), 147–252. [https://doi.org/10.1016/0883-0355\(87\)90035-8](https://doi.org/10.1016/0883-0355(87)90035-8)
- Garton, B., Dyer, James, and King, B. (2000) The use of learning styles and admission criteria in predicting academic performance and retention of college freshmen. *Journal of Agricultural Education*. 41.10.5032/jae.2000.02046.
- Geiser, S., & Santelices, M. V. (2007). Validity of high-school grades in predicting student success beyond the freshman year: High-school record vs. standardized tests as indicators of four-year college outcomes. Research & Occasional Paper Series. <http://files.eric.ed.gov/fulltext/ED502858.pdf>
- Golding, P., & Donaldson, O. (2006). Predicting academic performance. Frontiers in Education Conference, 36th Annual, 21-26. doi:10.1109/FIE.2006.322661
- Gomez, F. E. (2017, August). Predicting academic performance: A ... - SFA scholarworks. <https://scholarworks.sfasu.edu/cgi/viewcontent.cgi?article=1076&context=etds>.
- Harackiewicz, J. M., Tauer, J. M., Barron, K. E., Elliot, A. J. (2002). Predicting success in college: A longitudinal study of achievement goals and ability measures as predictors of interest and performance from freshman year through 97 graduation. *Journal of Educational Psychology*, 94, 562-575. doi:10.1037//0022-0663.94.3.562
- Johnston, C. G. (2006). Predictors of college success among African American, Caucasian, and Hispanic students. Dissertation. Texas Tech University.
- Kagan, S., Carroll, J., Comer, J., & Scott-Little, C. (2006). Alignment: A missing link in early childhood transitions? *Young Children*. 61.
- Kelly, M.E., Patterson, F., O'Flynn, S., Mulligan, J., & Murphy, A.W. (2018). A systematic review of stakeholder views of selection methods for medical schools admission. *BMC Med Educ.*, 18(1),139.
- Kurz, A., Talapatra, D., & Roach, A. T. (2012). Meeting the curricular

- challenges of inclusive assessment: The role of alignment, opportunity to learn, and student engagement. *International Journal of Disability, Development and Education*, 59(1), 37–52. <https://doi.org/10.1080/1034912x.2012.654946>
- Liu, X., & Lee, L. F. (2010). GMM estimation of social interaction models with centrality. *Journal of Econometrics*, 159(1), 99–115. <https://doi.org/10.1016/j.jeconom.2010.04.009>
- Malaga, X., & Oducado, R. M. (2021, March 22). Does senior high school strand matter in nursing students' academic self-regulated learning and academic performance? SSRN. [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3802973](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3802973).
- Magbag, A., & Raga, R. (2019). Prediction of college academic performance of senior high school graduates using machine learning, Proc. International Conference on Emerging Technologies 2019, Daejeon, South Korea, unpublished.
- Magbag, A., & Raga, R. (2019). Prediction of college academic performance of senior high school graduates using classification techniques. *International Journal of Scientific & Technology Research*, 9, 04.
- Magdadaro, L. R. P. (2020). Passion-based vs. practical-based preference of strand in senior high school. *International Journal of Academic Research in Business and Social Sciences*, 10(3). <https://doi.org/10.6007/ijarbss/v10-i3/7031>
- Mascolo, J. T., Alfonso, V. C., & Flanagan, D. P. (2014). *Essentials of planning, selecting, and tailoring interventions for unique learners*. John Wiley & Sons.
- Mcdonald, D. R. (2000). Prediction models for performance on the elementary and secondary Professional Development Examination for the Certification of Educators in Texas. Dissertation. Texas A&M University.
- McIntosh, J., & Munk, M.D. (2007). Scholastic ability vs family background in educational success: Evidence from Danish sample survey data. *Journal of Population Economics*, 20, 101–120. [http://vbn.aau.dk/da/publications/scholastic-ability-vs-family-background-in-educational-success-evidence-from-danish-sample-survey-data\(2c5d8080-7d04-11de-9240-000ea68e967b\)/export.html](http://vbn.aau.dk/da/publications/scholastic-ability-vs-family-background-in-educational-success-evidence-from-danish-sample-survey-data(2c5d8080-7d04-11de-9240-000ea68e967b)/export.html)
- Mufti, T. S., & Qayum, I. (2014). Rehman Medical College admission criteria as an indicator of students' performance in university professional examinations. *Journal of Ayub Medical College, Abbottabad: JAMC*, 26(4), 564–567.
- Noble, J. (2003). The effect of using ACT composite score and high school average on college admission decisions for racial/ethnic groups (ACT Research Report RR2003-1). ACT Inc.
- O'Connor, M. C., & Paunonen, S. V. (2007). Big five personality predictors of post-secondary academic performance. *Personality and Individual Differences*, 43(5), 971–990. <https://doi.org/10.1016/j.paid.2007.03.017>
- Official Gazette. (n.d.). The K-12 Basic Education Program. <https://www.officialgazette.gov.ph/k12/#section-7>
- Patterson, F., Knight, A., Dowell, J., Nicholson, S., Cousans, F., & Cleland, J. (2016). How effective are selection methods in medical education? A systematic review. *Med Educ.*, 50(1):36–60.
- Pike, G. R., & Saupe, J. L. (2002). Does high school matter? An analysis of

- three methods of predicting first-year grades. *Research in Higher Education*, 43, 187-207.
- Rajandran, K., Hee, T., Kanawarthy, S., Soon, L., Kamaludin, H., & Khezrimotlagh, D. (2014). Factors affecting first year undergraduate students' academic performance. Republic of the Philippines OFFICE OF THE PRESIDENT. (n.d.). <https://ched.gov.ph/wp-content/uploads/2018/01/CMO-No.-105-s.-2017-Policy-on-the-Admission-of-Senior-High-School-Graduates-to-the-Higher-Education-Institutions-Effective-Academic-Year-2018-2019.pdf>
- Reynolds, A. J., & Walberg, H. J. (1992). A structural model of science achievement and attitude: An extension to high school. *Journal of Educational Psychology*, 84(3), 371-382. <https://doi.org/10.1037/0022-0663.84.3.371>
- Rigney, T.J. (2003). A study on the relationship between entry qualifications and achievement of third level business studies students. *The Irish Journal of Management*, 117-138.
- Sawyer, R. K. (2010). Learning for creativity. In R. A. Beghetto & J. C. Kaufman (Eds.), *Nurturing creativity in the classroom* (pp. 172-190). Cambridge University Press. <https://doi.org/10.1017/CBO9780511781629.009>
- Smithers, S. Catano, V. & Cunningham, D. (2004). What predicts performance in Canadian dentals schools? *Journal of Dental Education*, 68 (6), 598-613.
- Sulphey, M. M., Al-Kahtani, N.S. & Syed, A.M. (2018). Relationship between admission grades and academic achievement. *Entrepreneurship and Sustainability Issues, Entrepreneurship and Sustainability Center*. 5(3), pp.648 - 658. [ff10.9770/jesi.2018.5.3\(17\)](https://doi.org/10.9770/jesi.2018.5.3(17)) ff. fhal-01829634f.
- Tiffin, P.A., Mwandigha, L.M., Paton, L.W. et al. (2016). Predictive validity of the UKCAT for medical school undergraduate performance: a national prospective cohort study. *BMC Med* 14, 140 (2016). <https://doi.org/10.1186/s12916-016-0682-7>
- Valli, Jayanthi, S., Balakrishnan, S., Lim Siok Ching, A., Aaqilah Abdul Latiff, N., & Nasirudeen, A. M. A. (2014). Factors contributing to academic performance of students in a tertiary institution in Singapore. *American Journal of Educational Research*, 2(9), 752-758. <https://doi.org/10.12691/education-2-9-8>
- Yousafzai, I. I., & Jamil, B. (2019). Relationship between admission criteria and academic performance: A correlational study in nursing students. *Pakistan Journal of Medical Sciences*, 35(3), 858-861. <https://doi.org/10.12669/pjms.35.3.217>
- Zwick, R., & Sklar, J. C. (2005). Predicting college grades and degree completion using high school grades and SAT Scores: The role of student ethnicity and first language. *American Educational Research Journal*, 42(3), 439-464. <https://doi.org/10.3102/00028312042003439>