

Readiness And Competency Level Of BEED Freshmen Students In GECMAT: A Basis For Bridging Program

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Abstract

This study aimed to determine BEED students' readiness and competency level in the GECMAT of Carlos Hilado Memorial State College. The 57 BEED first-year students enrolled in General Mathematics in the last first semester of 2019-2020 were the respondents of this study.

This study employed the quantitative method of research using descriptive - developmental statistics. Respondents had deficient readiness levels regardless of their senior high school strands, and the type of schools they last attended are significant findings of this study. The competency level of respondents was low. Consequently, they were unprepared to enter the tertiary level. They had difficulty understanding the content of the GECMAT course. Both public and private schools delivered the instruction in General Mathematics equally. The degree of correlation between competency and readiness level was deficient, but they are directly proportional.

The researcher recommended restructuring math topics in Senior high school. Enrolling in the bridging course before taking the GECMAT and modifying the screening process of students' admission to the said program are highly recommended.

Keywords: bridging program, competency, Mathematics, readiness, GECMAT course, senior high school,

Introduction

Success in mathematics is the key to student success in the 21st-century economy. Despite the movement to advance 21st-century skills in secondary education, student test data indicate that they are not mastering mathematics standards. The transition period in the field of education, where there was an offering of Senior High School (SHS) to students, was questioned about the importance of the additional years in high school, which meant more financial problems for their parents. However, if the students and parents see the relevance of the Senior High School tracks to their chosen

program in college, they will eventually accept this transition.

When students entered senior high school, they were not sure of the program they would choose in college. So, there could be a possibility of misaligning their chosen track and strands. Aside from that, the school cannot hinder students' choice of the program regardless of their SHS track.

The purpose of this research is to understand how former high school students prepared for college mathematics and to identify the areas of mathematics that need to put emphasized and improved. Their experience and insight can help improve high school math

instruction preparation for a successful college journey. Research has shown that high school students who have the opportunity to take higher levels of mathematics are prepared for college and eligible for higher-paying jobs [2]-[15]. This study will add to the literature to inform the ongoing efforts to improve high school mathematics experiences, opportunities, and outcomes for high school students.

The increased educational opportunities provided by community colleges are negligible because community college students are not meeting the academic requirements needed to complete a degree. The challenges adult learners face relate to how community colleges assess readiness skills. The reliability of college admission tests as a placement tool has been questioned, especially in mathematics [3]. It is imperative to know if students' math skills are being properly assessed so that they are appropriately placed into courses that will help them develop the skills needed to succeed in college math. Bailey (2017) described how community colleges have the potential to remedy college readiness disparities within their communities [4].

The result of this study will hint to the mathematics professors and administrators if there is a need to have a bridging course before taking the "Mathematics in the Modern World" (GECMAT) under the BEED program. It can also lead to modification of the screening process of students' admission to the BEED program.

Researchers who have studied a variety of interventions have reported findings that positively impact educational outcomes like persistence. Rutshaw and Schneider (2011) found that structured mentoring for students needing low-level remedial math improved students' persistence in those courses; however, it had no bearing on their success [5]. Boatman and Long (2018) found that students who require lower-

level remedial education in any subject have less favorable educational outcomes than those who require upper-level remedial courses or none. Still, little research has been done to specifically explore a potential relationship between success in remedial math and student success in the form of persistence or degree completion [6].

Objectives of the Study

This study's main objective is to determine students' readiness and competency level in the BEED program of Carlos Hilado Memorial State College – Binalbagan Campus considering their Senior High School Strands. Specifically, this study aimed to answer the following questions: 1. What is the student's profile in terms of Senior high school strand and type of school last attended? What is the student's level of readiness upon entering the Bachelors of Elementary Education program? 3. What is the competency level of the students in terms of Number Patterns, Arithmetic Sequence, Mathematical Language and Symbols, and Data Management? 4. Is there a significant difference in their competency level when they are grouped according to the variables mentioned above? 5. Is there a significant relationship between students' competency level and readiness level? and 6. What bridging course/program can be proposed based on the findings?

Definition of Variables

GECMAT-operationally refers to the course offered to all Carlos Hilado Memorial State College students regardless of the program they enrolled in. The course's descriptive title is "Mathematics in the Modern World."

Readiness- the state of being fully prepared for something

Competency- the ability to do something successfully or efficiently.

Significance of the Study

Administrators: Design a refresher or bridging class for first-year students who had low grades in senior high school general mathematics even though they passed the screening process of their chosen program.

Teachers: Provide intervention material to view and manipulate by the learners and review and revisit the least mastered skills.

Future Researchers: Explore other possible variables that would encourage students to enhance their Mathematical skills and abilities. They may conduct parallel studies in other programs that require senior high school strand alignment.

Materials and Methods

a. Participants and/or other Sources of Data

The study included 57 BEED first-year students enrolled in GECMAT at Carlos Hilado Memorial State College-Binalbagan Campus for the first semester of the academic year 2019-2020. It involves two sections, 30 students from BEED 1-1 and 27 from BEED 1-2. This study used the descriptive–developmental study. The descriptive method is designed for the investigator to gather information about existing conditions. Likewise, it is developmental because it developed a bridging program in the topics found to be least mastered by most students[19].

b. Data Gathering Methods

The quantitative method of research using descriptive - developmental statistics was employed in this study to ensure high levels of reliability of gathered data. It involved the collection and analysis of quantitative data. Descriptive statistics deals with procedures to summarize the information in measurements [9].

The means and standard deviations were computed to determine the readiness level in Mathematics among first-year students. The researchers asked permission from the Dean of Carlos Hilado Memorial State College, Binalbagan Campus, to conduct this study. Simple random sampling was used in selecting respondents.

Students' scores in Mathematics were collected by GECMAT professors and computed the mean of their scores to classify students' level of competency. The scores were converted into descriptive equivalent using the K to 12 Curriculum grading system.

The researchers used the "Personal Information Form" to collect data regarding students strands in the senior high school program and the type of school they have last attended. The teacher-researchers personally delivered the instruction to the respondents to determine their competency level. The actual implementation of this study was conducted within the first semester of the school year 2019-2020. Before the instruction, a modified readiness test and researcher-made questionnaire were made. The experts validated both to answer the problems stated.

The results were analyzed using the mean and percentage to determine the proportion of students belonging to a specific category. The latest K to 12 Curriculum proficiency levels served as the basis of student competency in GECMAT.

Below is the description of students' scores parallel to the level of proficiency used in the K to 12 Curriculum as stated in Dep. Ed Order # 31, 2012 [10].

Raw Scores	Mean Scores	Percentage Value	Descriptive Rating
36-40	35.61-40	90% and above	Advanced

34-35	33.61-35.60	85-89%	Proficient
32-33	31.61-66.60	80-84%	Approaching Proficiency
30-31	29.61-31.60	75-79%	Developing
0-29	0-29.60	74% and below	Beginning

The level of proficiency was used to describe the mean scores of respondents with corresponding percentage equivalents. The percentage equivalent determined the student's readiness and competency level.

Transmutation table for K to 12 Curriculum, as specified in Dep. Ed Order # 08 s.2015 was used to describe the mean percentage scores of respondents with the corresponding equivalent transmuted values [11]. Descriptive statistics such as the mean were used to describe respondents' readiness and competency level.

Data obtained from the results of tests were treated statistically using the Statistical Procedure for Social Sciences (SPSS) version 21. The t-test for the independent sample was used to test the difference in their scores considering the type of school they last attended. One-way ANOVA was used to test the difference among respondents' scores in their senior high school strand. Pearson's moment correlation coefficient was used to determine if a significant relationship exists between readiness and competency level, as well as the degree and direction of the relationship.

Results and Discussion

This section discusses the presentation, analysis, and interpretation of research output based on the objectives. This includes observing any similarities between the current findings and

those of other studies based on the established parameters and citing their implications for the entire study.

Table 1. Respondents' Profile

Respondents' Profile	Frequency
SHS Strand	
GAS	7
ABM/STEM	2
HUMS	35
TecVoc/Lifelong	13
Type of School	
Public	46
Private	11
Total	57

Table 1 reveals the respondents' senior high school strand and the type of school they last attended. In terms of their Senior High School Strands, 35 of them are HUMS, GAS is 7, 2 of them are ABM/STEM, and 13 of them went to TecVoc/Lifelong. Moreover, it shows that 46 of them are from public and only 11 of them are from private schools.

Table 2 Respondents' Level of Readiness

Scores	Frequency	Percentage	Mean Score	Level of Proficiency
0-29	57	100	5.68	Beginning

Table 2 shows that all respondents were categorized under the beginning level of proficiency. They have very low mean scores obtained in the 40-item readiness test regardless of their senior high school strands and the type of schools they graduated from. Furthermore, this indicates that they were unprepared to enter the tertiary level.

Their experience and insight can help improve high school math instruction to better prepare students for college success. Research

has shown that high school students who have the opportunity to take higher levels of mathematics will be better prepared for college and eligible for higher-paying jobs [2]-[15]. In the United States, the National Council of Teachers of Mathematics has conducted a readiness test for the Mathematics of first-year college students. They found out that 12th-grade students do not demonstrate mathematical proficiency, suggesting that students transitioning from high school to college may not be ready for its rigors [12]. In the Philippines, the Department of Education (DepED) conducts the National Achievement Test (NAT) for second-year high school students annually. Dep. Ed. has embarked on intervention programs to improve key performance indicators in primary education. Based on the result of the previous years, the Mathematics achievement of the students is meager [13]. Study shows that math teachers, through the students' cooperation, shall do something to attain the objective of mastery level, especially in Mathematics achievement [14].

Table 3 Competency Level of Respondents

Scores	Frequency	Percentage	Mean Score	Level of Proficiency	School	Mean	Mean Difference	t	P-value
0-29	57	100	20.63	Beginning	Public	21.02	2.02	1.748	.619
					Private	19.00			

Table 3 reveals that all respondents were categorized under the beginning level of proficiency. They have very low mean scores in the 40-item midterm test regardless of their senior high school strands and the type of schools they came. It implies that they had difficulty understanding the content of this course. High school students who complete advanced mathematics courses are more likely to be proficient in high school achievement, college entrance exams, high school graduation, college performance, and college graduation, and obtain higher employment earnings[8]. Martin et al. (2017) advocated that "a strong preparation in

high school mathematics readies students for future success in their jobs, their continued education, their personal lives as citizens, and their social responsibilities in our democratic society" [15]. Maruyama (2012) wrote that there is an increase in demand for jobs needing advanced mathematical skills requiring college degrees, which means that a growing number of students need to be educated in post-secondary mathematics education for future economic success[2]-[7]. To address these ongoing recommendations and implications the National Council of Teachers of Mathematics (NCTM, 2000) identified mathematics standards to guide K–12 instruction and assessment to ensure students' preparedness for the rigors of college math. However, studies indicate that students graduating from high school continue to lack proficient mathematics skills to participate in college-level mathematics[16].

Table 4 T-test Analysis on the Difference of the Test Results Grouped According to Type of School

Table 4 presents the test on the significant difference in midterm scores when respondents are grouped according to the type of school they last attended. Respondents who graduated from public school had a mean score of 21.02, while those who came from private school had a mean of 19.00. They had a mean difference of 2.02, which seems to be very minimal. The p-value of 0.619, which is greater than 0.05, indicates no significant difference in their scores. It implies the acceptance of the null hypothesis that no significant difference exists between the

respondents' type of school they last attended. Moreover, this indicates that public and private schools delivered General Mathematics instruction equally.

The students in both types of institutions are taught similar knowledge and skills in similar grades, engage in similar learning tasks, read similar literary works and textbooks, and participate in similar extracurricular activities". Regardless, it is a common notion that society tends to place private schooling on a higher pedestal, saying it is the better choice for any child. Of the parents that would choose a private school, did they base their choice on these common assumptions of society, or did they carefully examine the options and choose the best school for their child's individual needs. Parents should learn to focus more on their individual viewpoints and ignore the influence of society because conclusions from this project suggest that private school superiority may not be entirely true[17]. Many sources show that the academic gains in public schools often beat the private schools. Additionally, the social factors that surround a public school may offer a better chance of social acceptance for all types of students[18]. Both types of schools have been said to provide good college preparation and AP courses.

Table 5 Analysis of Variance on the Difference of the test Results Grouped According to Senior High School Strand

Source of Variation	df	MS	F	P-value
Between Groups	5	17.838	1.516	.201
Within Groups	51	11.766		
Total	56			

Table 5 shows the analysis of variance on the significant difference in midterm scores when respondents are grouped according to their senior high school strand. It revealed the p-value of 0.201, which is greater than 0.05, which means no significant difference in their scores. It implies the acceptance of the null hypothesis that there is no significant difference among respondents' senior high school strands. Moreover, this indicates that the competency level of respondents is equally the same regardless of their chosen strand. It is parallel to the study of Herrera and Dio (2016) about the prerequisite knowledge needed in General Mathematics for senior high school. It was revealed that Grade 10 students are moderately ready on 68% of the prerequisite competencies. It indicates that the students acquired the minimum knowledge and skills in the prerequisite competencies of General Mathematics. It may be why the high school seniors got a fair competency because they only acquired the minimum prerequisite knowledge and skills in the subject matter. They further concluded that the overall MPS of 40% denotes that the respondents are moderately ready for General Mathematics in Senior High School.

Moreover, they discovered that 32% of the prerequisite competencies for senior high school, as identified by the grade 10 Math teachers, fall under the unprepared category. It informs that the students did not acquire mastery of the prerequisite competencies. Hence, it was stressed that students were not ready for the General Mathematics topics. Also, it highlighted that teachers were not ready during the implementation of the senior high school. He further noted a considerable gap among students' mathematical abilities. Hence, having very heterogeneous classes, finding one approach that would suit all learners' styles and paces was very difficult. It may be one of the possible reasons why high school seniors got difficulty in General Mathematics; that is to say, in the first place,

teachers themselves are still adjusting to the new curriculum[19].

Table 6. Pearson Correlation between Competency and Readiness Level

N	Coefficient(r)	P-value	Degree of Correlation
57	0.090	.505	Very low

Table 6 shows the p-value of 0.505, which is greater than 0.05, which means a significant relationship exists between the competency and readiness level of the respondents. The degree of correlation is very low since coefficient $r = 0.090$. Furthermore, this implies that readiness and competency levels are directly proportional. As the readiness level increases, the competency level also increases. The respondents least mastered all the skills mentioned above. It could mean that much difficulty could be experienced when the topics where these competencies are prerequisites are taught. It is supported by Pratt (2015), who concluded that mathematical skills are built on one another, and pupils need to build a strong mathematical skill or concept that they learn will be built on that foundation. If the students master the identified competencies, learning the contents of SHS's General Mathematics topics will be easier [20]. Cruz (2015) stated that "Math" in Grades 7 to 10 prepares students for the SHS core subjects of "General Math" and "Statistics and Probability." Grade 7 to 10 is collectively called Junior High School in the Philippine Educational System[21]. Similar to the findings of Dio and Herrera (2015), who stated that the mastery of prerequisite skills at a certain level prepares the learner to cope with the demands of more complex concepts and applications at the next level. As one progresses through the learning experiences of higher levels, more opportunities become available for

mastering more complex concepts and competencies increasingly and for optimizing the development of higher thinking skills[22].

According to Mamolo (2019), the reason why students had difficulty with these competencies was because of the difficulty of the topics or those that were not discussed. The assessment results of the student's competency in General Mathematics are alarming. Teachers may find ways to deal with the students in a more engaging manner. They may be able to consider using other teaching strategies and revisit the curriculum plan stipulated for better instructional purposes. Learners may try to strive harder in learning math concepts. They are encouraged to be well-informed on how their performance in the classroom and national assessment examinations affects themselves and the school. They may be reminded of their responsibility that taking exams in any form is not just a measure of competence but also for the teachers and the school system. Curriculum planners, including teachers and principals, may consider a few revisions to the stipulated curriculum guides, especially since the results revealed that senior high school students only have "fair" competency in General Mathematics. They may consider restructuring the math topics per subject area and plan a better way to have a more effective and efficient teaching-learning process. It is further recommended for a more detailed assessment review, which includes qualitative means in soliciting data for deeper understanding to support the quantitative data provided [23].

Based on the results, the researchers suggest that the Bridging Mathematics Program is needed before taking the GECMAT course. It will help Math Professors and students review and revisit their competencies in learning Mathematics, increase their proficiency level, and enhance the student's performance in the said course. This bridging program aims to 1. Develop the learner's Mathematical skills focusing on the

least mastered competencies; 2. Improve the speed, accuracy, and mastery of the Mathematical skills by answering Math drills and exercises thru individual worksheets and activities and group performances.; 3. Enhance the learner's skills in solving mathematical problems; 4. Intensify the learners' critical thinking skills by exposing them to real-life application of Mathematics.; and 5. Involve the learners to become actively involved in the bridging activities.

The Strategic Intervention Materials (SIMs) will be developed for the General Mathematics of Senior High School, and the least mastered prerequisite skills of the said subject such as (1) determining if the equation is a function or just a mere relation; (2) graph quadratic and polynomial functions; (3) solve word problems involving simple interest; and (4) writing logical proof.

Conclusion and Recommendations

The readiness and competency level of all respondents were categorized under the beginning level of proficiency. They had difficulty understanding the content of the General mathematics and GECMAT course, respectively. It was found that there is no significant difference in the competency level of the respondents in terms of the type of school they last attended. Moreover, both public and private schools delivered the instruction equally. It was revealed that a significant relationship exists between the competency and readiness level of the respondents. Furthermore, the readiness and competency level are directly proportional to each other.

Restructuring math topics in Senior high school, enrolling in the bridging course before taking the GECMAT, and modifying the screening process of students' admission to the BEED program are highly recommended. Parallel studies can be conducted on other

curricular programs, especially courses requiring licensure examination.

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