Self-concept and Academic Performance in Mathematics of Senior High School Students

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ABSTRACT

The study investigated the relationship between Self-concept and Academic Performance in Mathematics of Senior High School Students. The respondents of this study are the 119 senior high school students of Sugod Senior High School, Sugod Bacon District Sorsogon City. Data were collected using a 30-item self-concept questionnaire checklist adopted from the study of Peteros (2012). Their academic performances were assessed using their average rating in General Mathematics for the 1st Semester, S.Y. 2020-2021. The collected data were treated using percentage, weighted mean, Chi square and t-test statistics, tested at 0.05 level of significance. Students have varied levels of self-concept along learned, organized and dynamic which are described as moderate. Most of the students got an overall level of performance which is described as satisfactory with moderate self-concepts. The self-concept of the students along learned, organized and dynamic are significantly related to each other. It was suggested that teachers should develop in their student's positive self-concept towards Mathematics and establish a pleasant teaching experiences to enhance higher self-concept and better performance in mathematics.

Keywords - *Self-Concept, Academic Performance, Senior High School Students, Mathematics*

1. INTRODUCTION

Each child is a unique individual. His mental ability and self-concept is different from others. His personality, ability, personal experiences and individual perception towards his personal existence also differs. Rogers (1959) discusses personality theory as the notion of self or self-concept which is defined as "the organized, consistent set of perceptions and beliefs about oneself. The development of self-concept is influenced by a person's experience during his childhood and evaluation of others.

Various studies were conducted to determine the factors affecting the student's academic performance. Among these, is the student's self-concept which play an integral part for both outcomes and conditioning of the learning process. It is evident that how a person feels about himself has a great deal to his or her scholastic achievement. It is not merely that the child knows the academic and literacy skills in a particular classroom environment but also the way he feels and perceives himself in that situation. The context of self-concept is evaluating oneself as to the way he/she thinks, feels, acts, values and evaluates himself or herself along of physical, mental and emotional ability.

Self-concept Theory (Sincero 2012), strictly define self-concept as the totality of beliefs, preferences, opinions and attitudes organized in a systematic manner, towards our personal existence. It is how we think of ourselves and how we should think, behave and act out our various life roles. Self-concept is categorized into three aspects. First, self-concept is learned. Individuals develop the self-concept and can be changed, as he grows old. Second, self-concept is organized. Students who think that they are useful in Math and perform well in the subject would likely develop a positive self-concept towards the subject. Third, the self-concept is dynamic. As individuals experience different situations in life, his beliefs may change depending upon what kind of situation he experiences and how they respond to these experiences. The students' experience in school is significant in molding their self-concept towards any academic subject, especially in subjects wherein most students find this subject challenging. (Cited in Peteros 2019)

Psychologists believe that students' positive attitudes toward learning and positive self-perception of their competence have a great impact on their motivation and thus enhancing academic gain (Shen, 2002; Shen & Talavera, 2003) (Cited in Mamolo et al, 2020). Moreover, philosophers like Dewey & James, stated that self-concept is a dynamic organization of values, goals and

ideals which determined by how an individual behaves in his environment. Thus, an individual behaves according to his self-concept.

High school students tend to develop their own identity in school and act accordingly on what is expected from them. This situation is relevant to the school responsibilities and tasks that students may encounter in school. If students develop their self-concept towards the subject, they will identify their perceived limitations and strengths of the subject. Hence, they perform tasks according to their perceived capabilities. (Nosek, et al, 2002 Cited in Peteros 2019)

Students' self-perceptions about their academic abilities are vital in their effort to adjust with their school tasks and responsibilities because these perceptions could influence the extent of efforts exerted for their school tasks. On the other hand, students who have high self-concept on a particular subject likely aims to perform well in whatever related tasks are given to them. In turn, this brings positive effects on their performance in the subject. Thus, a high academic self-concept directly relates to better academic achievement. (Khalaila 2015, cited in Peteros 2019)

Since, self-concept is developed through experience, the need to enhance it into a dynamic self-concept deemed necessary. Hence, students should be given varied learning experiences in the classroom that would boost their interest towards Mathematics subject. With the full support of the teachers, the learning gap in Mathematics maybe addressed by enhancing student's self-concept. Hence, this study aimed to examine the relationship of self-concept and academic performance in Mathematics of senior high school students in a public senior high school of Sorsogon City Division, Philippines, School Year 2020–2021, specifically it sought answer to the following research questions:
1.) What is the level of self-concept of the students towards mathematics as learned, organized and dynamic?
2.) What is level of academic performance of the students in Mathematics according to the level of self-concept as learned, organized and dynamic?
3.) Is there a significant relationship between the self-concept and academic performance of the students in Mathematics?
4.) What can be proposed based on the result of the study?

2. METHODOLOGIES
2.1 Research Design
This study aimed to determine the relationship between self-concept and academic performance in Mathematics of senior high school students in Sugod, S.Y. 2020-2021.

This study employed a descriptive-correlational research design in the collection of data from the population by means of survey questionnaire. The 119 senior high school students of Sugod Senior High School are the respondents of this study. The data were organized, tallied and summarized, interpreted and analyzed based on the results of data gathered by the use of appropriate statistical tools and measures.

2.2 The Sample
The population frame of the study are the 119 senior high school students of Sugod Senior High School in Bacon East District, Sorsogon City, Philippines. They were all given questionnaires with the help of the class advisers, but due to COVID 19 Pandemic it was difficult to retrieve all the questionnaires. Only 119 out 170 students returned them. The table shows the identified respondents.

Table 1: The Respondents

Track	Frequency	Percentage (%)
TVL	87	73%
GAS	32	27%
TOTAL	119	100%

The table shows that there are 87 students under TVL track which is 73% of the total respondents, while there are only 32 or 27% among the students are under the GAS track with a grand total of 119. The students ages range from 16-30 years.

2.3 The Instrument
The researcher prepared and utilized a questionnaire checklist in gathering the data. The questionnaire is adapted from study of Peteros (2012), which consists of 30 statements about Mathematics self-concept as learned, organized, and dynamic. They were asked to rate themselves based on each statement as to the level of their perception on the extent that these statements described their self-concepts in Math. The instrument used a three-point Likert scale with responses such as 3-High, 2-Moderate, and 1-Low. The academic performance of the students is the average rating in General Mathematics for S.Y. 2020-2021.

2.4 Data Analysis Procedures
The constructed instrument was shown by the researcher to the panel of evaluators before it was administered for the dry run and validation. The researcher personally distributed the instrument to the respondents with the help of the class advisers. To establish rapport and cooperation, respondents were given proper instruction on how to answer the test. The answered questionnaires were retrieved after a week of the distribution. There are 119 retrieved answered questionnaires out of 170 distributed questionnaires which was considered by the researcher as the final sample for the study. The average rating of the respondents in Mathematics were requested from the respondents' class adviser.

The gathered data underwent systematic procedures of processing to ensure validity and reliability of results. Appropriate statistical tools were used in treating the data using the MS Excel. Frequency, weighted mean and percentage.

The scale below was used to describe the adjectival description on the level of math self-concept of the students; 2.34 – 3.00 – High, 1.67 – 2.33- Moderate, 1.0 – 1.66 –Low.

The Chi square test was used to find the relationship between the level of self-concept and academic performance in Mathematics of senior high school students of Sugod Senior High School.

The academic performance of the students was measured according to the following description; 90-100- Outstanding; 85-89 -Very Satisfactory; 80-84- Satisfactory; 75-79 - Fairly Satisfactory; Below 75 - Did not meet expectation.

Results
In this study, the relationship between self-concept and academic performance in Mathematics of senior high school students were investigated.
1. *Level of self-concept as to learned, organized and dynamic*

Table 2A presents the level of self-concept as to learned. The computed weighted means, the overall means and their respective descriptions are also provided. It can be seen from the

table that the students believed that they can only learn mathematics in an average level of learning skills. It can be noted that the computed overall means yielded to 2.04 which is described as moderate. This level of the students' self-concept could be based on their experiences that they were not able to solve difficult problems in Mathematics and that they think that not all these problems have answers. They think that learning Mathematics gives meaning to their activities. Students find the meaning of their task in the subject, which helps them realize the need to learn the subject.

Table 2A: Level of Self-concept as to Learned

a. Learned	WM	Des
1. I learned Mathematics quickly	1.98	Mod
2. In my Mathematics class, I understand even the most challenging work	1.98	Mod
3. I have never felt incapable of learning Math	2.01	Mod
4. I am good at Mathematics	2.05	Mod
5. I am capable of making good grades in Mathematics	2.02	Mod
6. I can do extra work to learn mathematics	2.02	Mod
7. Learning Mathematics gives meaning to learn activities	2.20	Mod
8. Even the work in Mathematics is hard, I can learn it.	2.06	Mod
9. Every problem in Mathematics is answerable	2.05	Mod
10. I am sure I can learn the skills taught in Mathematics	2.08	Mod
Overall Mean	**2.04**	**Mod**

Further, the students considered themselves not so good in learning mathematics. They are not really confident and sure with their capabilities and skills to gain knowledge and improve their mathematical skills. Some reasons and attributes for these could be their previous performances in mathematics in which they are not satisfied to have as their foundation not to mention their demographic profile, teacher and school factors. This is an implication that the students need to be assisted to enhance their self-concepts in learning mathematics subject.

The findings are also emphasized by Reyes (1984) who describes academic self-concept as a person's "perception of self with respect to achievement in school". In particular, a person's mathematics self-concept refers to the perception or belief in his or her ability to do well in mathematics or confidence in learning mathematics.

The findings are also discussed by Rogers (1959) that personality theory as the notion of self or self-concept which defined as organized, consistent set of perception of being oneself. The development is influenced by a person experience during his childhood and others evaluation towards oneself. He believes that every person can achieve his goal, desire, wishes if actualization takes place.

The results can also be associated with the ideas of Shavelson, Hubner and Stanton (1976) who believe that self-concept is the perception that each one has, about him, formed from experiences and relationships with the environment, where significant people play an important role. Self-concept, as a component of human personality development, has its own nature and peculiarity.

Table 2A.2 presents the level of self-concept as to organized. It can be observed from the table that the students perceived a moderate level of self-concept along organized. It can be noted that the overall mean for is 2.03 which is described as moderate.

Self-concept is organized when it is developed in a person based on the consistency of one's perception of the reality of himself, which is consistent with what he experienced. The results show that the students considered their experiences in mathematics to be their base line and reference which they have acted upon and tried to settle all challenges and problems according to their priorities.

Table 2A.2: Level of Self-concept as to Organized

a. Organized	WM	Des
1. I usually does well in Math	2.0	Mod
2. Mathematics is more enthusiastically for me than for a significantly number	2.0	Mod
3. I have dependably accepted that Mathematics is a stand out among my best subjects	1.99	Mod
4. I get good marks in Mathematics	1.94	Mod
5. Mathematics is an easy subject to pass	1.85	Mod
6. Mathematics is worth passing well	2.0	Mod
7. Mathematics help to find a new way of finding things	2.19	Mod
8. When I do Math, I feel confident that I done it correctly	2.01	Mod
9. It takes me any longer to comprehend Mathematics ideas than the average individual	2.08	Mod
10. When I have difficulties in Math, I know I can handle them if I try	2.22	Mod
Overall Mean	**2.03**	**Mod**

Explicitly, the students perceived that when they have difficulties in Mathematics, they believe that they can handle them when they keep on trying. This could be due to the students' experiences that when they try to solve challenging tasks in Math, they can perform such tasks when they started to face and act on them. Moreover, students believe that the subject can help them find a new way of finding things, which can be related to their experiences when solving Math problems using their way. However, the students do not perceive mathematics as an easy subject to pass. This implies that Math is a tricky subject.

Further, the data imply that the self-concept of the students based on their beliefs that they can perform well in the subject when they exert more effort in doing Math-related tasks. However, this self-concept needs to be improved because this can help the students develop a positive attitude towards the subject, thus, improved their academic performance.

Table 2A.3: Level of Self-concept as to Dynamic

a. Dynamic	WM	Des
1. .I can do practically all the work in Mathematics class if I do not give up	2.31	Mod
2. Mathematics improves my understanding of other subjects	2.12	Mod
3. Mathematics improves my learning and retention capabilities	1.94	Mod
4. I feel delighted when answering mathematics	2.07	Mod
5. Mathematics is suitable for all students	2.22	Mod

6. Mathematics encourages me to apply detailed steps to solve my problems	2.32	Mod	
7. Mathematics makes me thinks fast	2.11	Mod	
8. My present knowledge of Mathematics concept is high	2.03	Mod	
9. Mathematics is essential in the future	2.25	Mod	
10. I am comfortable in Mathematics	1.99	Mod	
Overall Mean	**2.14**	**Mod**	

It is reflected in table 2A.3 the level of self-concept as to dynamic. It can be observed from the table that almost all of the students have moderate level of self-concept along dynamic with an overall mean of 2.14.

This means further that the students showed moderate enthusiasm and interest in working with mathematical and practical problems which enhances their self-concept along organized. They are actually contended with what they have and what they can do to manage answering such problems. It could also mean that the decisions of the students could change over time based on their experiences.

In addition, the respondents perceived that mathematics is essential in their future, which means that they also value the subject in their life because it would be useful in the future. They believe that they can use what they have learned in the subject in their daily living. Though the students have a high self-concept, they believe that their knowledge in the subject is not yet enough.

This is an implication that the students' self-concept needs to be improved since students with higher self-concept have greater chances of doing their tasks well, compared to those with lower level of self-concept. Tavani & Losh (2003) (Cited in Peteros 2019) found that students who have high academic self-concept have higher grades because they are more motivated to perform well in school. However, students who have low self-concept avoid school tasks because they consider these as threats, which led them to have poor performance.

The data is also being stressed by Machargo (1991) who perceives self-concept as a set of perceptions or reference points that the subject has about himself, a set of characteristics, attributes, qualities and deficiencies, capacities and limits, values and relationships that the individual knows to be descriptive of himself and which he perceives as data concerning his identity. This definition embraces issues including the set of knowledge and attitudes that we have about ourselves; the perceptions that the individual assigns to himself or herself and characteristics or attributes that we use to describe ourselves.

Table 3: Performance Level of the Students as to the Level of self-concept along learned, organized and dynamic.

Level of Self Concept	f	PL	Description
1. Learned			
a. Low	10	78.67	Fairly Satisfactory.
b. Moderate	95	84.45	Satisfactory
c. High	14	87.44	Very Satisfactory
Average PL		83.52	Satisfactory
2. Organized			
a. Low	12	78.28	Fairly Sat
b. Moderate	90	83.87	Satisfactory
c. High	17	86.93	Very Satisfactory
Average PL		83.02	Satisfactory
			Satisfactory

3. Dynamic			
a. Low	5	78.33	Fairly Sat.
b. Moderate	87	83.87	Satisfactory
c. High	16	87.01	Very Sat
Average PL		83.07	Satisfactory
Overall	**119**	**83.20**	**Satisfactory**

Table 3 presents the level of self-concepts of the students along learned, organized and dynamic. The frequencies for each scale along the three key variables are indicated as well as the performance level of the students and its descriptions. It can be noted that the computed overall PL of the students is 84% which is described as satisfactory.

It is presented in the table that there are only 10 students have low self-concepts along learned with the PL of 78.67 which is described as *fairly satisfactory*. These students assessed themselves that they can only learn mathematics in a low level. Further, the students considered themselves not so good in learning mathematics. They are not really confident and sure with their capabilities and skills to gain knowledge and improve their mathematical skills. Some reasons and attributes for these could be their previous performances in mathematics in which they are not satisfied to have as their foundation not to mention their demographic profile, teacher and school factors. Another is that slow learners usually displays low self-concepts. This is an implication that the students need to be assisted and help them enhance their self-concepts in learning mathematics subject.

It is also reflected in the table that there are 95 students who believed that they can only learn mathematics in a moderate level whose PL is 84.45 which is described as *satisfactory*. It seems that majority of the students believed that they can only learn mathematics in an average level of learning skills. This level of the students' self-concept could be based on their experiences that they were not able to solve very difficult problems in Mathematics and that they think that not all these problems have answers. On the other hand, they think that learning Mathematics gives meaning to their activities. Students find the meaning of their task in the subject, which helps them realize the need to learn the subject.

On the other hand, there are 14 students who believed that they can handle mathematics in a high level of learning with an average PL of 87.44 which is described as *very satisfactory*. Mathematics is considered a difficult subject such that only a few among the students could really learn the subject easily. The results show that students with higher grades assessed themselves to have a high self-concept in Mathematics. They usually can cope with the challenges and difficulties in the lessons. They can learn more than other students with average and lower grades than them.

The findings are emphasized by Reyes (1984) who describes academic self-concept as a person's "perception of self with respect to achievement in school". In particular, a person's mathematics self-concept refers to the perception or belief in his or her ability to do well in mathematics or confidence in learning mathematics.

The findings are also discussed by Rogers (1959) that personality theory as the notion of self or self-concept which defined as "the organized, consistent set of perceptions of being oneself. The development is influenced by a person experience during his childhood and evaluation of others. He believes that every person can achieve their goals, desire, wishes if actualization takes place.

The table shows that there are 12 students considered themselves to have low self-concepts whose average PL is 78.28 and is described as *fairly satisfactory*. This means that the students do not do well in Math and it takes time for them to learn and grasp the lessons. They don't have enough confidence that they can pass the subject. This denotes that these learners cannot gain high level of self-concept if they do not help themselves strive to have such.

It can be observed from the table that most of the students have perceived themselves to be in a moderate level of self-concept along organized with a frequency of 90 and an average PL of 83.87 with a description of 83.87%.

Self-concept is organized when it is developed in a person based on the consistency of one's perception of the reality of himself, which is consistent with what he experienced. The results show that the students considered their experiences in mathematics to be their base line and reference which they have acted upon and tried to settle all challenges and problems according to their priorities. However, the students do not perceive mathematics as an easy subject to pass. This implies that Math is a tricky subject

Consequently, there are 17 among the students believed that they have a high self-concept with an average PL of 86.93%. This means that the students have gained only enough confidence to face the world of mathematics. They certainly can handle and perform tasks in mathematics not so perfectly but can be considered as passed.

Explicitly, the students perceived that when they have difficulties in Mathematics they believe that they can handle them when they keep on trying. This could be due to the students' experiences that when they try to solve challenging tasks in Math, they can perform such tasks when they started to face and act on them. Moreover, students believe that the subject can help them find a new way of finding things, which can be related to their experiences when solving Math problems using their way. Further, the data imply that the self-concept of the respondents based on their belief that they can perform well in the subject when they exert more effort in doing Math-related tasks. However, this self-concept needs to be improved because this could help the students develop a positive attitude towards the subject, which can also help in improving the students' academic performance.

The results can also be associated with the ideas of Shavelson, Hubner and Stanton (1976) who believe that self-concept is the perception that each one has, about him, formed from experiences and relationships with the environment, where significant people play an important role. Self-concept, as a component of human personality development, has its own nature and peculiarity. Furthermore, self-concept includes both descriptive as well as evaluative aspects and can be differentiated from other constructs which it is related to, such as academic performance.

Finally, the table also shows that 5 of the students convinced themselves that they have low level of self-concepts with an average PL of *fairly satisfactory*. The group showed low level of perceptions with regards to engaging themselves in practical works in mathematics and in applying detailed steps in solving problems in mathematics which means that the students showed little enthusiasm and interest in working with the lessons in mathematics. Another is that they do not feel that mathematics can improve their knowledge and skills.

Similarly, there are 87 students with an average PL of 83.87 which is described as *very satisfactory*. These students are confident that they have moderate self-concepts along dynamic. This means that they have much enough knowledge to cope with problems in mathematics. Moreover, the students feel much comfortable in dealing with a step by step procedures in solving problems and believe that mathematics is important in the future. This indicates that the students do not exert more efforts in dealing with mathematical problems. They are actually contended with what they have and what they can do to manage answering such problems.

On the other hand, it could also mean that the decisions of the students could change over time based on their experiences. In addition, the respondents perceived that mathematics is essential in their future, which means that they also value the subject in their life because it would be useful in the future. They believe that they can use what they have learned in the subject in their daily living. Students also believe that they can almost do all the Math work if they are persistent enough in doing their tasks. Though the students have a high self-concept, they believe that their knowledge in the subject is not yet enough.

Accordingly, there are 16 students with an average PL of 87.01 which is described as *very satisfactory*. They are very much certain that they can handle mathematical and practical problems which enhances their self-concept along dynamic. Further, these students are amenable to have high level of confidence with regards to the issues and concerns along dynamic based on the indicators given. This is an implication that the students' self-concept with high self-concept have greater chances of doing their tasks well, compared to those with lower and moderate level of self-concept. It can also be observed that the overall Pl of the students is 83.20 which is described as satisfactory.

The self-concept of the students, which they found that students who have high academic self-concept have higher grades because they are more motivated to perform well in school (Tavani & Losh, 2003). However, students who have low self-concept avoid school tasks because they consider these as threats, which led them to have poor performance.

The data is also being stressed by Machargo (1991) who perceives self-concept as a set of perceptions or reference points that the subject has about himself, a set of characteristics, attributes, qualities and deficiencies, capacities and limits, values and relationships that the individual knows to be descriptive of himself and which he perceives as data concerning his identity. This definition embraces issues including the set of knowledge and attitudes that we have about ourselves; the perceptions that the individual assigns to himself or herself and characteristics or attributes that we use to describe ourselves.

3.RELATIONSHIP BETWEEN SELF-CONCEPT AND ACADEMIC PERFORMANCE OF SENIOR HIGH SCHOOL STUDENTS IN MATHEMATICS.

Table 4 reveals the results on the test of the relationship between self-concept and academic performance of the students in Mathematics. It can be observed in the table that the computed chi square values on the relationship between the self-concepts along learned and organized and dynamic are significantly related to the student's academic performance in mathematics.

The data shows that the computed chi square values along the identified variables are greater than the tabular value when the degree of freedom is 6 at .05 level of significance. Thus the hypothesis of no significant relationships are rejected.

Table 4: Relationship Between Self-concept and Academic Performance of Senior High School Students in Mathematics

Statistical Bases	Learned	Organized	Dynamic
Degree of freedom	6	6	6
Level of Significance	.05	.05	.05
Tabular Value	12.59	12.592	12.592
Computed Chi Square	22. 60	20.17	19.38
Decision on Ho	reject	reject	reject
Interpretation	significant	significant	significant

The data shows that the computed chi square values of 22.60, 20.17 and 19.38 along the identified variables are greater than the tabular value of 12.592 when the degree of freedom is 6 at .05 level of significance. Thus the hypothesis of no significant relationships are rejected.

This means that students' experiences in their academics whether they are relatively positive or negative significantly affect the student's self-concept. Other attributes to this effect can be the eagerness and attitudes of the students to learn more in mathematics. This is an implication that when the students do have a high level of self-concept the bigger chance that they could perform well in mathematics. Furthermore, when the students' self-concept is high, it can really be connected or associated with their academic performance. This indicates that the self-concepts of the students affect their performance in mathematics.

Academic self-concept relates to academic achievement and is defined as the belief in and feelings or perceptions of one's own intellectual and/or academic skills and achievement (Lent, Brown, & Gore, 1997). They found that academic self-concept has direct and indirect effects on academic achievement. This indicates a bidirectional relationship; Increases in academic self-concept lead to increases in academic achievement and vice versa. The findings confirm that academic self-concept plays an important role in influencing academic outcomes.

Furthermore, Valentine et al. (2004) distinguish the concept of academic self –concept from self-concepts in other domain of activity. In theory, a positive academic self-concept should lead to gain academic achievement. Specifically, students with positive views of their academic abilities are likely to engage in more achievement related behavior, which might include completing homework, studying for tests and participating in class activities. The context of academic self-concept is applied from educational perspective in relation to numerous academic outcomes.

In addition, Maligayo (1998) showed the significant relation of academic performance and self-concept. Not all factors of self-concept significantly related to academic performance. Only 0.01 level was observed between academic performance and each of the following variables; behavioral, intellectual and school status, physical appearance and attributes and popularity.

4. CONCLUSION
Based on the findings, the following conclusions are drawn:
1. The students have varied levels of self-concept along learned, organized and dynamic which are all described as moderate.

2. Majority of the students got an overall level of performance which is described as satisfactory.
3. There is a significant relationship between the self-concept of the students along learned, organized and dynamic and its academic performance in Mathematics.

5. RECOMMENDATION
The researcher recommends that the students be given meaningful activities to enhance their self-concept in Mathematics along its classification, thus, gain high academic performance.

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