



Mathematics Self-Concept and Performance of Freshman Education Students in an Online Learning Setup

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Abstract

This study examined the relationship between mathematics self-concept and academic performance in Mathematics in the Modern World among freshman students of the College of Education. Using a descriptive-correlational research design, data were gathered from the respondents and analyzed using frequency, percentage, mean, Pearson product-moment correlation, and Spearman's rank-order correlation. Most respondents were female late adolescents, as defined by the World Health Organization, and belonged to the youth sector under Republic Act No. 8044. Most came from households classified at least as lower-middle income based on the income classification of the Philippine Institute for Development Studies (PIDS) and received a modest weekly allowance. Most used more than one device with a low-to-moderate Wi-Fi connection for online learning, had a personal study space at home, and had a very good general weighted average (GWA). The respondents' mathematics self-concept was moderate, and their academic performance in Mathematics in the Modern World was average. No significant relationship was found between the respondents' profile and either their mathematics self-concept or their mathematics performance. However, mathematics self-concept was significantly and positively related to mathematics performance. Students with higher mathematics self-concept tended to perform better in the course. These findings suggest that strengthening students' confidence in their mathematical abilities may support improved achievement.

Keywords: Academic Self-Concept, Mathematics, Mathematics Performance, Online Learning Environment, Self-Concept

INTRODUCTION

Education is undergoing rapid change, and one of its most visible shifts is the movement of instruction from the physical classroom to online platforms. In the Philippines, the Department of Education (DepEd) and the Commission on Higher Education (CHED) have adopted alternative learning delivery modalities, chiefly distance learning and blended learning, so that students can continue

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learning beyond the traditional classroom. These modalities have widened the ways in which instruction can be delivered, but they have also placed new demands on students, who must now learn with greater independence and with whatever devices, Internet connectivity, and learning spaces are available to them.

For many college students, online learning became the primary mode of instruction. Online learning is a form of distance learning that takes place over the Internet rather than in a traditional classroom. It widens access to education because students can learn from anywhere and at any time, studying either part-time or full-time (El-Seoud et al., 2014); it refers to a situation in which the interaction between students and teachers is carried out through an online system (Salamat et al., 2018). Its flexibility, however, came with challenges. Students without a personal learning space at home were exposed to noise and other distractions (Baticulon et al., 2021; Bringula et al., 2021), and portions of courses had to be learned independently through asynchronous sessions, making students' capacity to study on their own a further obstacle to effective e-learning.

These difficulties were felt keenly in mathematics, a subject many students already find hard to grasp face to face and harder still to follow virtually. Freshman students took their mathematics courses entirely online, their engagement in virtual sessions was inconsistent, and many lost confidence and interest as remote instruction persisted from one semester to the next. Such a loss of confidence matters, because how students see themselves as learners of mathematics shapes how they engage with it.

This self-perception is captured by the construct of mathematics self-concept, which refers to an individual's assessment of his or her mathematical abilities in comparison with others (Bong & Skaalvik, 2003). It encompasses students' ratings of their own skills, ability, enjoyment, and interest in mathematics, and it is regarded as an important factor in mathematics education. Mathematics self-concept differs from self-efficacy: self-concept reflects self-perception in a general discipline such as mathematics (Marsh & Craven, 2006), whereas self-efficacy concerns the belief that one can perform a particular task in that field (Arens et al., 2020).

A substantial body of research links mathematics self-concept to achievement. It relates positively to mathematics performance (Kung, 2009; Lee & Kung, 2018) and, together with self-efficacy, predicts mathematics achievement (Kung, 2009). Seaton et al. (2014) found reciprocal relationships between mathematics self-concept and achievement among 2,786 Australian high school students. Pateros et al. (2019) reported that Grade 10 students had only a moderate mathematics self-concept, which was significantly related to their performance, and Dramanu and Balarabe (2013) found a similar relationship among Ghanaian junior high school students. A positive mathematics self-concept is also associated with the desire to pursue STEM programs (Sax et al., 2015) and with persistence in one's chosen program (Ackerman et al., 2013). Yet self-concept is not fixed; Erdogan (2014) found that it declined as pupils advanced through grade levels.

Studies of online mathematics point the same way. Güzeller and Akin (2012) found significant differences in performance, attitude, anxiety, and self-efficacy between web-based and traditional mathematics instruction, while Cho and Heron (2009) showed that motivation influenced online mathematics achievement. Factors beyond the learner, such as family support, teachers' attitudes, and peers (Othman et al., 2011), and parental support combined with personal traits (Tavani & Losh, 2003), also bear on achievement. This suggests that students' circumstances, including their access to devices, Internet connectivity, and a place to study, may affect both their mathematics self-concept and their performance.

Most of these studies, however, involved primary and secondary school learners in conventional classrooms. Comparatively little is known about the mathematics self-concept of college freshmen who learned mathematics online, particularly education students, whose beliefs about mathematics will one



day shape those of their own learners. It is in this context that the present study was conducted. It sought to determine the level of mathematics self-concept of freshman education students as online learners, to describe their mathematics performance, and to examine how their socio-demographic profile relates to both. The findings are expected to help teachers and administrators design online mathematics instruction that sustains students' confidence and motivation.

METHODOLOGY

This chapter contains the research design used in the study, the respondents and sampling technique, the research instrument used, the procedures used in data gathering, and the statistical treatment of data.

Research Design

The researchers used a descriptive-correlational research design to determine the relationship between the self-concept and academic performance of the respondents in mathematics. The descriptive research design that uses a questionnaire is the type of descriptive method researchers chose to use to further validate the data gathered in the study. The researchers believe this type of method is appropriate because it will make obtaining data on multiple respondents easier.

A correlational research design was used in this study. Correlational research is used to determine the significance of the relationship between two or more variables (Pattern, 2002). In this study, the researchers correlated two variables. Mathematics Self-Concept and Mathematics Performance.

Research Locale

The respondents in this study were freshman students enrolled in the College of Education at Wesleyan University-Philippines in the current Academic Year 2021-2022. The respondents' campus is located at Mabini Extension, Cabanatuan City (Wesleyan University-Philippines, 2022).

Sampling Procedures

The fifty (50) respondents were chosen using the purposive sampling technique. According to Alchemer, Purposive sampling, also known as judgmental, selective, or subjective sampling, is a type of non-probability sampling in which researchers choose members of the public to participate in their surveys based on their own judgment. The criteria for choosing the respondents were as follows;

1st Criterion - Freshman education students enrolled at Wesleyan University- Philippines.

2nd Criterion - With grades in Mathematics in the Modern World.

3rd Criterion - Active in online learning.

A total of fifty respondents to this research are 1st-year students of the College of Education at Wesleyan University-Philippines who are currently enrolled in the second semester of the school year 2021-2022. Data collection was conducted in May 2022.

Scope and Delimitation

The research is about the mathematics self-concept and performance of freshman education students in an online learning setup. The respondents of this study are the selected freshman students of Wesleyan University- Philippines, College of Education.



Research Instrument

According to O'Leary (2014), the questionnaire has many uses. More importantly, it discovers what the masses are thinking. This includes market research, political polls, customer service feedback, reviews, polling opinions, and scientific research.

The checklist was designed to get the important data and information about the respondents, specifically on the following: sex, age, parents' monthly income, weekly allowance, internet accessibility, device ownership, internet speed, and personal physical learning space access.

The second part used multiple-choice questions where students chose what general point average they got in their Mathematics in the Modern World.

The third part of the survey questionnaire adapted the questionnaire from (Kvedere, 2012), which consists of 30 statements describing the students' mathematics self-concept as learned, organized, and dynamic. They were asked to rate each statement according to the level of their agreement on the extent to which these statements describe their self-concepts in Math. The instrument used a five-point Likert scale with 5-Very High, 4-High, 3-Moderate, 2-Low, and 1-Very Low responses. The Likert scale or scale is usually five, seven, or nine points on the scale or scale of agreement used to measure respondents' agreement on various statements. Rensis Likert, a psychologist and organizational researcher, developed the Likert Scale to assess the level of agreement or disagreement using a symmetric measure of agreement and disagreement.

Data Gathering Procedures

The first step taken by the researchers was the frequent consultation of the thesis with the adviser. The researchers communicated with their advisers to guide them on what type of survey to use. The researchers appropriately used an online survey to survey the respondents.

Permission was obtained from the Dean of Wesleyan University-Philippines by presenting a letter requesting permission to conduct the study inside and outside the school.

Purposive sampling was used to choose samples. The respondents' survey questionnaires were administered.

We used Google Forms to conduct a survey questionnaire; this was one of the applications that we used to create surveys easily and quickly because it allowed us to plan a questionnaire, ask questions to students, and collect different types of information simply and efficiently. Google Forms allows you to include different types of questions, such as short answers, multiple-choice questions, boxes on a linear scale (Linear scale), and so on.

The researchers collected the survey forms, and the findings were tallied and tabulated. The data served as the foundation for analysis and interpretation.

Data Analysis

The collected data were analyzed using appropriate statistical tools in order to provide a meaningful descriptive interpretation of the study's results and findings. Cross tabulation was a method for analyzing the relationship between many variables quantitatively. Cross tabulation, often known as contingency tables or cross tabs, groups variables to analyze their relationship. It also demonstrates how correlations change as you move from one variable grouping to the next. This was used to address the first problem: "How can the respondents' profile be described in terms of sex, age, parents' monthly income, internet accessibility, device ownership, internet speed, and personal physical learning space access. Pearson's correlation coefficient is a test statistic used to determine the statistical relationship, or association, between two continuous variables. Because it is based on the concept of covariance, it is recognized as the best approach to quantifying the relationship between variables of interest. It indicates



the size of the link, or correlation, as well as the direction of the relationship. Spearman correlation coefficients are also known as Spearman rank correlations and Spearman's rho. It is usually represented by the Greek letter rho (ρ) or rs. Like all correlation coefficients, Spearman's rho reflects the strength of the relationship between two variables.

RESULTS AND DISCUSSION

This chapter contains the data collected by the researcher who responded to the problems mentioned in this first part. Based on the study conducted on the topic of "Mathematics self-concept and Performance of freshman education students in an online learning setup."

Presentation, Analysis, and Interpretation of Data

1. Profile of the respondents

Table 1.1 shows the sex of the respondents, with females having the highest response with 36 and 72 percent, followed by males with 14 and 28 percent. It simply means that female respondents outnumber male respondents.

Table 1.1. Sex

Sex	Frequency	Percent
Male	14	28.00
Female	36	72.00
Total	50	100

Table 1.2 shows the age of the respondents, and the most are the age 19, with a number of 34 responding and with 68 percent, and the least is the age 21 and above with 0 and with 0 percent. It simply means that the students who became respondents were of the right age.

Table 1.2. Age

Age (in years)	Frequency	Percent
21 and above	0	0.00
20	7	14.00
19	34	68.00
18	9	18.00
Total	50	100

Table 1.3 shows the monthly income of the parents. The income of parents' respondents is 35,001 with a number of 20 responded and with 40 percent, the least 15,001 – 25,000 with a number of 5 responded and with 10 percent. It simply means that the majority of the parents' monthly income was 35,001 and above per month.



Table 1.3. Parents' Monthly Income

Parents' Monthly Income	Frequency	Percent
35,001 and above	20	40.00
25,001-35,000	16	32.00
15,001-25,000	5	10.00
5,000-15,000	9	18.00
TOTAL	50	100

Table 1.4 shows the weekly allowances of the respondents, the most allowances of the respondents are 300 pesos with a number of 17 responded and with 34 percent, the least 900 pesos with a number of 6 responded and with 12 percent. It simply means that the weekly allowance of the respondents is 300 pesos.

Table 1.4. Weekly Allowances

Weekly Allowance	Frequency	Percent
1,200 and above	12	24.00
900	6	12.00
600	15	30.00
300	17	34.00
TOTAL	50	100

Table 1.5 shows the internet accessibility of the respondents, with WIFI having the highest with 41 and 82 percent, followed by Mobile Data with 9 and 18 percent. It simply means that WIFI is the most used access in online learning.

Table 1.5. Internet Accessibility

Internet Accessibility	Frequency	Percent
WI-FI	41	82.00
Mobile Data	9	18.00
TOTAL	50	100

Table 1.6 shows the device ownership of the respondents and the number of devices used by respondents. Two Devices with a number of 24 responded with 48 percent, and the last four and more devices with a number of 2 responded and 4 percent. It simply means that the majority of the respondents used two devices during online learning.

Table 1.6. Device Ownership

Device Ownership (Phone/Laptop/PC)	Frequency	Percent
One Device	16	32.00
Two Devices	24	48.00
Three Devices	8	16.00
Four or more Devices	2	4.00



TOTAL	50	100
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Table 1.7 shows the internet connectivity of the respondents, the most internet speed of the respondent 1 to 10mbps with a number of 17 responded and with 34 percent, the least 31mbps and above with a number of 5 responded and 10 percent. It simply means that the internet speed of the respondents is not that fast.

Table 1.7. Internet Speed

Internet Speed	Frequency	Percent
1 to 10mbps	17	34.00
11 to 20mbps	14	28.00
21 to 30mbps	14	28.00
31mbps and above	5	10.00
TOTAL	50	100

Table 1.8 shows the personal space for learning of the respondents, with personal space having the highest with 31 and 62 percent, followed by without personal space with 19 and 38 percent. It simply means that every respondent had space for online learning.

Table 1.8. Personal space for online learning

Personal Space for online learning	Frequency	Percent
With personal space	31	62.00
Without personal space	19	38.00
TOTAL	50	100

Table 2 presented the Performance level of the respondents and revealed that 17 or 34 percent of the respondents were in the range of 1.61 – 1.75 (Above Average), 11 or 22 percent were in the range of 1.76 – 2.00 (Average), 10 or 20 percent were at the range of 2.01 – 2.25 (Below Average), 8 or 16 percent were at the range of 1.26 -0 1.50 (Very Good), 2 or 4 percent were at the range of 1.01 – 1.25 (Excellent), 1 or 2 percent were at the range of 2.26 – 2.50 and 3.00 and above respondents had Low Average and Passed in their grade point average (GPA) in Mathematics In The Modern World.

Table 2. Mathematics Performance of the Respondents

Level	Numerical Rating	Frequency	Percent
Outstanding	1.00	0	0.00
Excellent	1.01-1.25	2	4.00
Very Good	1.26-1.50	8	16.00
Above Average	1.51-1.75	17	34.00
Average	1.76-2.00	11	22.00
Below Average	2.01-2.25	10	20.00
Low Average	2.26-2.50	1	2.00



Poor	2.51-2.75	0	0.00
Passed	3.00 and above	1	2.00
Mean	1.885 (Average)	50	100

Overall, the performance in Mathematics in The Modern World is Average (1.885). This finding intends to convey that the respondents were Good at Mathematics.

The study by Dev (2016) showed that this study's consistent academic accomplishment of primary school students may be due to a fairly good home environment and the Interest of the students in their studies.

The study by Pateros et al. (2019) suggested that the lower grades in the class indicate problems with learning that need to be addressed to improve students' performance, which is not a good sign when it comes to the teaching-learning process concerned.

3. Respondents' Level of Self-Concept

This part presented the respondents' self-concept level, which was assessed in the three areas as reflected in the Self-Concept Theory, which discussed that Self-concept is learned, self-concept is organized, and self-concept is dynamic.

Table 3.1 shows that the overall weighted mean is 3.21, meaning that a moderate self-concept level is learned. The highest self-concept learned with moderate verbal description is item number 10; they are sure that they learned what was taught in their skill in their class, with a weighted mean of 3.38. Also, item number 8 with moderate verbal description that even if the work in Mathematics is hard, I can learn it, with a weighted mean of 3.36. However, the lowest is item number 2: In my Mathematics class, I understand even the most challenging work, with a weighted mean of 3.02 and a verbal description of moderate. It means that students in the College of Education understand even the hard topics taught to them by professors.

Table 3.1. Self-Concept Learned

Indicators	Mean	Description
A. Learned		
1. I learn Mathematics quickly.	3.14	Moderate
2. In my Mathematics class, I understand even the most challenging work.	3.02	Moderate
3. I have never felt incapable of learning Math.	3.06	Moderate
4. I am good at Mathematics.	3.04	Moderate
5. I can make a good grade in Mathematics.	3.32	Moderate
6. I do extra work to learn Mathematics.	3.20	Moderate
7. Learning Mathematics gives me meaning to learn activities.	3.32	Moderate
8. Even if the work in Mathematics is hard, I can learn it.	3.36	Moderate
9. Every question in Mathematics is answerable.	3.26	Moderate
10. I am sure I can learn the skills taught in Mathematics class well.	3.38	Moderate
Overall:	3.21	Moderate



Legend (Verbal Description): 1.00 to 1.79 Very Low; 1.80 to 2.59 Low; 2.60 to 3.39 Moderate; 3.40 to 4.19 High; 4.20 to 5.00 Very High

Table 3.2 shows that the overall weighted mean is 3.25, which means that the moderate level of self-concept is organized. The highest self-concept is organized with high verbal description is item number 7; mathematics helps to find a new way of finding things with a weighted mean of 3.54. Also, item number 6, with a high verbal description, states that Mathematics is worth passing well, with a weighted mean of 3.50. However, the least is item number 5; mathematics is an easy subject to pass, with a weighted mean of 2.76 and a verbal description of moderate. It means that students in the College of Education believe that mathematics courses are not easy to pass.

Table 3.2. Self-Concept Organized

Indicators	Mean	Description
B. Organized		
1. I usually do well in Mathematics.	3.18	Moderate
2. Mathematics is more exciting for me than for a significant number of my schoolmates.	3.18	Moderate
3. I have definitely accepted that Mathematics is a standout among my best subjects.	3.12	Moderate
4. I get good marks in Mathematics.	3.22	Moderate
5. Mathematics is an easy subject to pass.	2.76	Moderate
6. Mathematics is worth passing well.	3.50	High
7. Mathematics helps to find a new way of finding things.	3.54	High
8. When I do Math, I feel confident that I have done it correctly.	3.10	Moderate
9. It takes me any longer to comprehend mathematics ideas than the average individual.	3.48	High
10. When I have difficulties with Math, I know I can handle them if I try.	3.40	High
Overall:	3.25	Moderate

Legend (Verbal Description): 1.00 to 1.79 Very Low; 1.80 to 2.59 Low; 2.60 to 3.39 Moderate; 3.40 to 4.19 High; 4.20 to 5.00 Very High

Table 3.3 shows that the overall weighted mean is 3.32, which means the respondents had a moderate level of self-concept dynamics. The highest self-concept dynamic with a high verbal description is item number 9, Mathematics is essential in the future, with a weighted mean of 3.70. Also, item number 1, with a high verbal description, states that I can do practically all the work in Mathematics class if I do not give up, with a weighted mean of 3.44. However, the lowest is item number 8; my present knowledge of mathematical concepts is high, with a weighted mean of 3.04 and a verbal description of moderate. This means that students in the College of Education believe mathematics is essential in our daily lives.



Table 3.3. Self-Concept Dynamic

Indicators	Mean	Description
C. Dynamic		
1. I can do practically all the work in Mathematics class if I do not give up.	3.44	High
2. Mathematics improves my understanding of other subjects.	3.28	Moderate
3. Mathematics improves my learning and retention capacities.	3.40	High
4. I feel delighted when answering Mathematics questions.	3.32	Moderate
5. Mathematics is suitable for all students.	3.18	Moderate
6. Mathematics encourages me to apply detailed steps to solve my problems.	3.30	Moderate
7. Mathematics makes me think fast.	3.38	Moderate
8. My present knowledge of mathematical concepts is high.	3.04	Moderate
9. Mathematics is essential in the future.	3.70	High
10. I am comfortable in Mathematics.	3.20	Moderate
Overall	3.32	Moderate

Legend (Verbal Description): 1.00 to 1.79 Very Low; 1.80 to 2.59 Low; 2.60 to 3.39 Moderate; 3.40 to 4.19 High; 4.20 to 5.00 Very High

In general, the respondents had a moderate level of self-concept with an overall weighted mean of 3.26. The data imply that the self-concept of the respondents is based on their belief that they can perform well in the course when they exert more effort in doing mathematics-related tasks. However, this self-concept needs to be improved because it could help respondents get high grades in the course, which can also help improve the students' academic performance.

In this study, the respondents' self-concept needs to be improved since students with high self-concept are more likely to complete their activities successfully than those with poor self-concept. Students' self-concept, whereby they discovered that students with strong academic self-concept get higher grades because they are more driven to achieve well in school (Tavani & Losh, 2003). On the other hand, students with low self-concept avoid school tasks because they perceive them as threats, resulting in poor performance.

The study by Othman et al. (2011) showed that there is a weak significant relationship between students' self-concept and academic achievement, a weak significant and negative relationship between students' intrinsic motivation and academic achievement, and a weak significant and negative relationship between students' self-determination and academic achievement. Previous research has found that several critical elements influence student academic achievement, including self-concept, intrinsic drive, and self-determination, both directly and indirectly. Aside from this association, there are additional aspects that are less obvious but important in contributing to the success of the students' performance. Significant others' roles, such as family support, teacher attitudes, and peer understanding, are among the elements identified in this study.

4. Is there a significant relationship between the profile of respondents; and

This part presents the relationship of two variables to determine whether the correlation between variables is significant and compare the p-value to your significance level. Usually, a significance level is



not greater than 0.05. A value of 0.05 implies the chance of determining a correlation exists when, in fact, no correlation exists is 5%.

Table 4.1 shows the following results of the Profile of the respondents: sex ($r = 0.132$, $p = 0.36$) age ($r = -0.108$, $p = 0.456$), parents monthly income ($r = -0.18$, $p = 0.211$), weekly allowances ($r = 0.158$, $p = 0.273$), internet accessibility ($r = 0.004$, $p = 0.98$), device ownership ($r = -0.261$, $p = 0.067$), internet speed ($r = -0.162$, $p = 0.256$), and personal space for online learning ($r = 0.099$, $p = 0.495$) is not significantly related to their mathematics performance. This means the profile of the respondents is not connected with their performance in mathematics.

Table 4.1. Performance in Mathematics

Correlation	Performance		
Profile	r-value	p-value	Interpretation
Sex	0.132	0.36	No significant relationship
Age	-0.108	0.456	No significant relationship
Parents Monthly Income	-0.18	0.211	No significant relationship
Weekly Allowances	0.158	0.273	No significant relationship
Internet Accessibility	0.004	0.98	No significant relationship
Device Ownership	-0.261	0.067	No significant relationship
Internet speed	-0.164	0.256	No significant relationship
Personal Space for Online Learning	0.099	0.495	No significant relationship

Table 4.2 showed the following results of the Profile of the respondents: sex ($r = -0.128$, $p = 0.375$) age ($r = 0.15$, $p = 0.3$), parents monthly income ($r = 0.06$, $p = 0.681$), weekly allowances ($r = -0.178$, $p = 0.215$), internet accessibility ($r = 0$, $p = 1$), device ownership ($r = -0.053$, $p = 0.714$), internet speed ($r = -0.08$, $p = 0.58$), and personal space for online learning ($r = -0.091$, $p = 0.528$) the Profile of the respondents is not significantly related to their self-concept in mathematics. This means the profile of the respondents is not connected with their self-concept in mathematics.

Table 4.2. Self-Concept in Mathematics

Correlation	Mathematics Self-Concept		
Profile	r-value	p-value	Interpretation
Sex	-0.128	0.375	No significant relationship
Age	0.15	0.3	No significant relationship
Parents Monthly Income	0.06	0.681	No significant relationship
Weekly Allowances	-0.178	0.215	No significant relationship
Internet Accessibility	0	1	No significant relationship
Device Ownership	0.053	0.714	No significant relationship
Internet speed	-0.08	0.58	No significant relationship



Personal Space for Online
Learning

-0.091

0.528

No significant relationship

Tella (2010) supported the findings of this study when they investigated the relationship between math achievement and self-concept in senior secondary school students and found no gender differences in math self-concept that were statistically significant.

Based on the findings of Pateros et al. (2019), there are no differences between male and female respondents' perceptions of the three aspects of their own selves. The gender-based variations in respondents' self-concept means do not differ statistically from one another. This suggests that when gender is considered, the respondents' self-concepts are on par.

According to the study's findings Othman et al. (2011), there is a weak significant relationship between students' self-concept and academic achievement, a weak significant and negative relationship between students' intrinsic motivation and academic achievement, and a weak significant and negative relationship between students' self-determination and academic achievement.

Table 5 shows the significant relationships between Mathematics self-concept and the performance of the respondents in their Mathematics course.

Table 5. Significant Relationship Between Mathematics self-concept and the Performance of freshman education students

Correlation	Performance		
	r-value	p-value	Interpretation
Mathematics Self-Concept	.379**	0.007	Significant relationship

***correlation is significant @ 0.01 level*

Mathematics self-concept is significantly related to the performance of the respondents. The positive r-value of .379** ($p < 0.01$) means that the higher the self-concept of the respondents, the higher their performance in mathematics (GPA). This implies that students with a high mathematics self-concept got a positive or high grade in Mathematics.

This finding is consistent with the results of (Dramanu & Balarabe, 2013), who discovered a significant relationship between self-concept and academic performance of 1470 Ghanaian junior high school students.

Seaton et al. (2014) study suggested that motivated students and those with strong academic self-concepts do better academically. Although there is strong evidence that there is a reciprocal relationship between academic self-concept and success, there is less evidence that there is a comparable relationship between achievement goal orientations and achievement.

CONCLUSIONS

Based on the findings of the study, the following conclusions were drawn:

1. The freshman education students have attained an acceptable but not yet proficient level of competence in mathematics. Their average performance shows that they are able to meet the basic requirements of their mathematics courses, but they have not yet reached the level of mastery expected of future teachers.
2. The freshman education students have not yet fully developed confidence in their mathematical abilities. Their moderate self-concept suggests that they regard themselves as neither highly capable nor incapable mathematics learners, which leaves considerable room for growth in how they perceive their capacity to learn mathematics.



3. The respondents' personal, socioeconomic, and online learning profile does not account for differences in their mathematics performance or in their mathematics self-concept. Hence, the null hypotheses of no significant relationship between the respondents' profile and their mathematics performance, and between their profile and their mathematics self-concept, are accepted.
4. Mathematics self-concept is closely linked to mathematics performance. Students who view themselves as capable mathematics learners tend to perform better in their mathematics courses. Hence, the null hypothesis of no significant relationship between mathematics self-concept and mathematics performance is rejected. This suggests that strengthening students' mathematics self-concept may be a meaningful avenue for improving their mathematics performance.

CONFLICT OF INTEREST

The author declares that there is no conflict of interest regarding the publication of this article.

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