Vol. 17 · July 2014
Print ISSN 2012-3981 • Online ISSN 2244-0445
doi: http://dx.doi.org/10.7719/jpair.v17i1.281
Journal Impact: H Index = 3 from Publish or Perish

JPAIR Multidisciplinary Research is produced
by PAIR, an ISO 9001:2008 QMS certified
by AJA Registrars, Inc.

Self-Efficacy and Academic Performance in Algebra among First-Year Private Non–Sectarian High School Students

LOLLY JEAN C. SIMBULAS
ORCID No. 0000-0002-7483-5911
lollyjeansimbulas@gmail.com
University of the Immaculate Conception
Davao City, Philippines

ABSTRACT

The determinants of students' academic performance caught the attention of many scholars for many years now. Among other factors, self-efficacy proved to be an important predictor of academic performance. In an educational context, self-efficacy refers to students' expectations about their ability to complete academic tasks successfully. Learners, who are unsure of their ability to complete the task, often give up when they encounter difficulties. This study tested the relationship between self-efficacy and academic performances in Algebra among first-year private non-sectarian high school students. The research design was descriptive- correlation survey method that utilizes a modified tool in Algebra self-efficacy scale in order to gather data from 163 first-year students from different high schools in Davao City. The academic performance measured in this study was based on students' third-quarter grades. Data were treated using Mean and Pearson Product - Moment Coefficient of Correlation. The results of the study indicated that the level of students' self–efficacy on Motivational Strategies, Cognitive Strategies, Resource Management, and Self-Regulated Learning is high. Furthermore, students' level on academic performance in Algebra is satisfactory. Self-efficacy was not significantly related to academic performance in Algebra.

The study recommends using a standardized test in algebra to measure students' academic performance and with a bigger sample proportionate to the population of each school.

Keywords - Mathematics Education, self–efficacy, academic performance, algebra, first year students, private non-sectarian, descriptive-correlational design, Davao City, Philippines

INTRODUCTION

One of the most common goals of educational institutions and educators is to nurture the students' self-direction and personal efficacy. Thus creating a favorable atmosphere for active learning is a necessity since it is a social place for development and growth for learners. They should be engaged in specific strategies that offer them opportunities to make decisions; process information effectively and become more reflective about their thinking and learning process. To respond to this call, educational institutions prepare the learners of adapting systems that help them engage in the self-regulated learning.

Zimmerman (1990) described self-regulated students as those who are automatically aware of their knowledge and ability to apprehend, control, and use their thinking process. They are confident, independent, and active participants of their learning process through the use of meta-cognitive strategies (Risemberg & Zimmerman 1992; Zimmerman & Martinez-Puns 1988). A self-regulated learner is capable of using specified strategies to achieve individual's academic goals on the basis of self-efficacy perceptions (Zimmerman 1989). Self-efficacy beliefs determine how an individual think, feel, behave and motivate themselves. It also refers to the confidence an individual have in their abilities in order to be successful in a given task (Bandura 1997). According to the Social Cognitive Theory, one of the most important factors that influence academic performance and achievement is self-efficacy. The study showed that students may perform poorly on a given tasks not certainly because the absence of the required ability to succeed, but because they lack confidence in their capabilities (Shkullaku, 2013).

Many studies have been carried out about self-efficacy and academic performance. Scholars have reported that self-efficacy is a good predictor of math performance. Chemers, Hu, and Garcia (2001) reported that students with higher self–efficacy strive longer periods and use more efficient problem-solving strategies than those with lower self–efficacy. The proponents further

claimed that self–efficacy is seen to be related to the achievement of students in mathematical analysis. Sullivan and Guerra (2007) found out those students in good academic performance tend to have high self-efficacy compared to those students under academic probation. In the same way, Ferla et al. (2009) claimed that the academic self-efficacy is the better predictor for academic performance. The study of Al-Harthy et al. (2010) revealed a significant positive relationship between students' self-efficacy and total scores. Self-efficacy was found out to be the strongest predictor of students' total score as demonstrated in the path analysis.

Here in the Philippines, there are a number of students who lack the command of stimulus in the learning field and experience low achievement in their field (Santos, 2000). We can see the importance and emphasis given by our government to the two-core subjects: math and science. However, the Philippine education has shown significant decline in terms of students' performance. In the Trends in International Mathematics and Science Study (TIMSS), testing the national performance of 13 – year – old students, Philippines ranked third from the bottom in 2003. Our country's profile in its own achievement test reflects what is reported by the TIMSS result. Department of Education (DepEd) reported that almost 66.7% of the country's high schools performed poorly in the 2011 National Achievement Test (NAT).

This national scenario of students' poor performance is not far from the performance of high school students from private secondary schools in Davao City. As revealed by the Department of education report, it shows that in Davao region, the poor performance of high school students from private schools was marked by the low over-all mean percentage score of 34.80% in the 2011-2012 National Achievement Test in mathematics.

It is in this framework that the researcher is encouraged to determine factors affecting students' academic performance. However, this study focused only on one possible factor – the academic self-efficacy and one mathematics area – the Algebra. Furthermore, the researcher is encouraged to determine the relationship of self-efficacy and academic performance in Algebra among first-year high school students.

FRAMEWORK

This study is anchored on Bandura's Social Cognitive Theory, which states, "Students with high self-efficacy regarding the academic matter would lead to

greater success. It is believed that the higher the sense of efficaciousness the greater the effort, persistence and resilience; those with more efficacious beliefs make things happen. This makes sense intuitively and is supported by other studies as well (Chapmann et al., 1990; Pintrich et al., 1994)."

Pintrich (1999) said that self-efficacy and learning strategies have been found to be related with academic performance. High achiever students utilize more self-regulated learning strategies compared to low achiever students. Likewise, Schunk (1983) expressed that having high-self-efficacy beliefs sustains task involvement. On the other hand, a lower sense of efficacy leads to less persistence, which lowers the level performance. The statements paint a clear picture of the role of self-efficacy perceptions in achievement. Higher self-efficacy leads to the behavior that is most consistent with success in overcoming the challenges in school.

Moreover, Pajares and Miller's (1994) study revealed that the actual students' ability to solve mathematics problems was predicted by the students' judgments of their ability to solve those problems.

Similar to Pajares and Miller's study, the present study considers the self-efficacy construct to be meditative tool that might strengthen other factors, which could also help students during the learning process. However, this study is limited only to private non-sectarian high schools.

In this study, the independent variable is the Self–Efficacy in Algebra on Motivational Strategies, Cognitive Strategies, Resource Management, and Self-Regulated Learning. The dependent variable is the academic performance of the first-year high school students on Polynomials, Linear Equations and Inequalities.

OBJECTIVES OF THE STUDY

This study described the level of self–efficacy and academic performance in Algebra. It also determined the relationship between self–efficacy and academic performance of first-year high school students.

METHODOLOGY

This study made use of a descriptive-correlational survey method. It is descriptive in nature since it assessed the level of students' self–efficacy in Algebra. At the same time, this study is a correlational since it determines whether self-efficacy has a relationship to the students' academic performance in Algebra.

One hundred sixty-three first-year high school students were selected from 5 private non-sectarian high schools of Davao City. Cluster sampling technique was used in determining the sample size in which every class/section was considered as one group and was randomly selected.

The data were gathered through revised questionnaire in Algebra self–efficacy scale, which was patterned in the study, entitled "Assessing Mathematics Self-Efficacy of Diverse Students from Secondary Schools in Auckland: Implications for Academic Achievement." It was modified to ensure that it fitted the academic and local setting. It underwent a validation process by selected mathematics teachers with a validation rating of 4.35.

As part of the research ethics protocol, a letter of permission was sought from respective Vice President of Academic Affairs and principals for the conduct of the study. Two months before the administration of the self-efficacy questionnaire, the math teachers were asked to keep track of students' academic performance on polynomials, linear equations, and inequalities. This role of the teacher was very significant since students' rating for the three topics was the basis of their academic performance. Before the administration of the questionnaire, informed consent was obtained from the respondents. The questionnaire was administered by the researcher with the help of the respondents' adviser and math teachers. Confidentiality of the responses was strictly observed. Collation of the responses followed after the retrieval of the questionnaire. Data were treated using Mean and Pearson Product - Moment Coefficient of Correlation.

The analyses of data were done using statistical software. Descriptive and inferential analyses were performed. Mean was used to describe students' self–efficacy in Algebra and level of academic performance. Pearson Product - Moment Coefficient of Correlation was used to determine the relationship between self–efficacy in Algebra and academic performance of the participants.

RESULTS AND DISCUSSION

Level of Students' Self-Efficacy

Table 1 summarizes the mean of the four areas of Self–Efficacy. The computed analyses showed the mean scores of the four areas of Self–Efficacy range from 3.67 – 4.0 on a 5-point scale. The values indicate that students' self–efficacy is high. That means that the students are behaviorally active participants of their learning. In this particular inquiry, respondents' exhibit high belief in facilitating their learning, such as finishing their assignments on time, taking down notes during

class session. Furthermore, students find time going to the library and getting information about their lessons, participate in class discussion and interactions, and ask clarification about their lessons in Algebra. They highly believe that when motivated to study hard, they can understand the different concepts presented to them, answer the most complex problems, master the skills taught to them quickly, and work on their assignment independently.

This result is parallel to the point of view of Schunk (1983) that having high-self-efficacy beliefs sustains task involvement and were more likely participate in class in the academic area. The statements paint a clear picture of the role of self-efficacy perceptions in achievement. Higher self-efficacy leads to the behavior that is most consistent with success in overcoming the challenges in school.

Table 1. Level of self–efficacy of first-year high school students

Self–Efficacy	**Mean**	**Description**
Motivational Strategies	3.70	High
Cognitive Strategies	3.78	High
Resource Management	3.67	High
Self – Regulated Learning	4.00	High
Overall Self - Efficacy	**3.66**	**High**

Level of Students' Performance in Algebra

The academic performance measured in this study was limited only to three topics, namely: the polynomials, linear equations, and inequalities. The result showed that the topic Linear Equations obtained the highest mean score of 82.93, followed by Inequalities with 82.56 and Polynomials with 81.94. The values indicate that students' achievement is satisfactory.

Comparing this result to students' level of self-efficacy conforms to the viewpoint of Tschannen – Moran and Hoy (1998) that self–efficacy has to do with self–perception of competence, but it is not the real level of competence. This was very evident in this study. While respondents reported high levels of self–efficacy, the level of performance attainment is only satisfactory. In the same way, Schunk (1994) says that high self-efficacy will not create competent performances in the absence of requisite skills.

Table 2. Level of the Mathematics Achievement of first-year high school students

Area of Mathematics Achievement	Mean Score	Description
Polynomials	81.94	Satisfactory
Linear Equations	82.93	Satisfactory
Inequalities	82.56	Satisfactory
Overall Achievement	**82.55**	**Satisfactory**

Correlation between Students' Self – Efficacy and Academic Performance in Algebra

Tested for this purpose is the null hypothesis that the self-efficacy is not associated significantly with academic performance in algebra among first year private non – sectarian high school students. The Pearson r was used to measure the relationship of the two variables at 0.05 level of significance.

The computed r for the motivational strategies was –0.049 (P-value = .531), -0.128 (p-value = .104) for the cognitive strategies, 0.121 (p-value = .124) for the resource management and for the self – regulated learning was –0.040 (p-value = .611). All r values have a negligible correlation interpretation. Furthermore, the probability values of all indicators are found not significant. The overall values of academic performance and self–efficacy in Algebra are being correlated with computed r equal to -0.030 that has a quantitative interpretation of negligible negative correlation and with a probability value of .708. Result revealed that the self-efficacy is not related significantly with the respondents' academic performance

Based on the results, this study cannot claim that self–efficacy in Algebra affects the students' academic performance. It negates the claims of the previous studies. The results revealed that participants had high levels of Algebra self-efficacy, and believed in their capability to achieve their goals in Algebra. However, the high level of student self-efficacy in Algebra did not translate into academic achievement. Among reasons mentioned by researchers for inconsistencies between self-efficacy and students' achievement are with respect to the source of self-efficacy information, importance of the assigned task, and the presence or absence of abilities required to accomplish the task. Bandura (2001) highlighted the importance of mastery learning as the major means of developing skills. He states that while efficacy can improve motivation, students cannot produce "new-fangled performances" if the sub-skills for the exercise of individual activity are absent (Bandura, 1997).

This result agrees to the study of Lee (2009), investigating the factorial structure of three math self-constructs (math self-concept, math self-efficacy and math anxiety) in predicting math performance, results reveals that Asian countries like Korea and Japan, shows low math self-concept and math self-efficacy and high math anxiety despite of the fact that their scores in math performance is high. It further suggests that math performance is not affected by the level of math self-constructs of the students which was evident in this study that students' high self-efficacy, as one of the math self-constructs, did not produce high level of academic performance in Algebra.

CONCLUSIONS

This study investigated the relationship between self–efficacy and academic performance in Algebra among first-year high school students. The result of the study showed that the level of self–efficacy of all areas is high. Furthermore, the students' academic performance is satisfactory. In this study, the computed r values suggest no relationship between self–efficacy and academic performance of the students. The result negates the claim of most of the studies that self-efficacy affect students' academic performances. Their high self-efficacy did not translate into academic achievement. Schunk (1994) says that the high self-efficacy will not create competent performances in the absence of requisite skills.

RECOMMENDATION

Based on the foregoing findings and conclusions drawn in this study it is highly recommended to conduct similar studies using a uniform standardized tool to measure students' academic performance and with a bigger sample proportionate to the population of each school.

LITERATURE CITED

Al-Harthy, I. S., Was, C. A., & Isaacson, R. M. (2010). Goals, efficacy and metacognitive self-regulation a path analysis. *International Journal of Education*, *2*(1).

Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual review of psychology*, *52*(1), 1-26.

Chapman, M., Skinner, E. A., & Baltes, P. B. (1990). Interpreting correlations between children's perceived control and cognitive performance: Control, agency, or means€ nds beliefs? *Developmental Psychology*, *26*(2), 246.

Chemers, M. M., Hu, L. T., & Garcia, B. F. (2001). Academic self-efficacy and first year college student performance and adjustment. *Journal of Educational Psychology*, *93*(1), 55.

Ferla, J., Valcke, M., & Cai, Y. (2009). Academic self-efficacy and academic self-concept: Reconsidering structural relationships. *Learning and Individual Differences*, *19*(4), 499-505.

Lee, J. (2009). Universals and specifics of math self-concept, math self-efficacy, and math anxiety across 41 PISA 2003 participating countries.*Learning and Individual Differences*, *19*(3), 355-365.

Marat, D. (2005). Assessing mathematics self-efficacy of diverse students from secondary schools in Auckland: Implications for academic achievement.*Issues in Educational Research*, *15*(1), 37-68.

Pajares, F., & Miller, M. D. (1994). Role of self-efficacy and self-concept beliefs in mathematical problem solving: A path analysis. *Journal of educational psychology*, *86*(2), 193.

Pintrich, P. R., Roeser, R. W., & De Groot, E. A. M. (1994). Classroom and individual differences in early adolescents' motivation and self-regulated learning. *Journal of Early adolescence*, *14*(2), 139-161.

Pintrich, P. R. (1999). The role of motivation in promoting and sustaining self-regulated learning. *International journal of educational research*, *31*(6), 459-470.

Risemberg, R., & Zimmerman, B. J. (1992). Self-regulated learning in gifted students. *Roeper Review*, *15*(2), 98-101.

Schunk, D. H. (1983). Developing children's self-efficacy and skills: The roles of social comparative information and goal setting. *Contemporary Educational Psychology*, *8*(1), 76-86.

Schunk, D. H., & Zimmerman, B. J. (1994). *Self-regulation of learning and performance: Issues and educational applications*. Lawrence Erlbaum Associates, Inc.

Shkullaku, R. U. D. I. N. A. (2013). The Relationship between Self–Efficacy and Academic Performance inthe Context of Gender among Albanian Students. *European Academic Research, 1 (4)*, 467-478.

Sullivan, J. R., & Guerra, N. S. (2007). A closer look at college students: Self-efficacy and goal orientation. *Journal of Advanced Academics*, *18*(3), 454-476.

Tschannen-Moran, M., Hoy, A. W., & Hoy, W. K. (1998). Teacher efficacy: Its meaning and measure. *Review of educational research*, *68*(2), 202-248.

Zimmerman, B. J. (1990). Self-regulated learning and academic achievement: An overview. *Educational psychologist*, *25*(1), 3-17.

Zimmerman, B. J., & Martinez-Pons, M. (1988). Construct validation of a strategy model of student self-regulated learning. *Journal of educational psychology*, *80*(3), 284.

Zimmerman, B. J. (1989). A social cognitive view of self-regulated academic learning. *Journal of educational psychology*, *81*(3), 329.