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Short Communication

Grit and academic self-efficacy as predictors of senior high school academic performance

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ABSTRACT

It is widely accepted that intelligent individuals are more likely to succeed compared to academically challenged individuals. Knowledge is, without a doubt, a powerful tool. But interestingly, for long term goals, it should be sealed with perseverance and passion, which is termed as grit, a non-cognitive trait. This study assessed the academic performance, grit and academic self-efficacy of 303 senior high school students in North District Carmen, Cebu using standardized scales. For data analysis, Pearson's correlation coefficient and multiple regression analysis were utilized as statistical tools. The results revealed that students' academic performance is rated as proficient with m = 86.86, SD = 3.31. Students' grit score has a m = 3.40, SD = 0.29, which indicates an above-average level of grit. In terms of academic self-efficacy, students have a mean of 4.00, SD = 0.46, indicating an above-average level of academic self-efficacy. Furthermore, a significant positive correlation among students' academic performance, grit, and academic self-efficacy was found with statistical significance at the level .01. It is concluded that an increase in grit and academic self-efficacy scores lead to an increase in academic performance. Finally, multiple regression analysis shows that students' grit and academic self-efficacy are statistically significant predictors of academic success, accounting for 12.3% of the variance in academic performance.

KEYWORDS: *Correlational, Social Science, Grit and Self-Efficacy, Carmen, Cebu, Philippines*

1 INTRODUCTION

People have been conditioned that intelligent individuals are bound to succeed. Numerous studies have established that intelligence and achievement are highly correlated (Chandra, and Azimmudin, 2013; Jensen, 1998 as cited in Kaya, Juntune, & Stough, 2013). In various measures of success, IQ accounted 33% of the variance (Neisser et al, 1996). However, there are some individuals of equal intelligence who have accomplished more than others. Terman and Oden (1947) urged further study of why intelligence does not always translate into achievement. Research findings suggest that intellect is not the most critical factor that leads to success as much as we thought. Non-cognitive personality characteristics such as interest (Schiefele, Krapp, & Wintler, 1992 as cited in Harackiewicz and Hulleman, 2010); conscientiousness and openness to experience have the biggest influence on academic success (Poropat, 2014), emotional intelligence accounted 80% of an individual's success in learning (Perera & DiGiacomo, 2013; Rupande, 2015). They were found out to be more predictive than IQ.

Duckworth and Quinn (2009) argued that grit is more effective than intelligence scores for explaining success. Duckworth (2007) popularized grit and defined it as the quality of being resilient and perseverant amidst difficulties and challenges in accomplishing an endeavor. Gritty individuals are motivated by challenges; they are dedicated to their goals with or without internal or external rewards. Perseverance of effort and consistency of interest are two facets of grit (Duckworth, Peterson, Matthews, & Kelly, 2007). They refer to the natural inclination to be diligent amidst obstacles and the quality of maintaining lasting goals and interests, respectively. Persistence and consistency are required in attaining mastery (Ericcson, Krampe, & Tesch-Romer, 1993).

Duckworth, Peterson, Matthews, & Kelly (2007) distinguished grit as a predictor of achievement from conscientiousness, self-control, resilience, and need for achievement. Grit intersects with achievement, dependability, and self-control aspects of conscientiousness, but its distinctiveness lies not in intensity instead in its emphasis on endurance and staying power over goals and interests. Self-control refers to one's ability to maintain control over one's attention, emotion, and actions in the face of temptation (Duckworth and Gross, 2014). Duckworth (2016) found that grit significantly correlates with self-control. However, she concluded that high levels of self-control do not equate to high levels of grit, suggesting that while

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some people with strong self-control can withstand temptations, they do not actively follow a dominant goal.

Grit did not correlate positively with IQ but was highly correlated with conscientiousness (Duckworth, Peterson, Matthews, & Kelly, 2007). It was also found to correlate with self-regulation, school satisfaction, and academic self-efficacy (Oriol, Miranda, Oyanedel, and Torres, 2017); self-control, well-being, and perceived stress (Kannangara, Allen, Waugh, Nahar, Khan, Rogerson, and Carson, 2018). It was also found out to be a significant independent predictor of participants with a GPA equal and greater than 3.5 (Pate, A.N., Payakachat, Harrel, Pate, K.A., Caldwell, and Franks, 2017). It also explained 17% of the variance in students' achievement (Beyhan, 2016).

Other research, such as Chang's (2014), found that the grit composite score did not substantially predict first-year students' GPA but that the perseverance subscale did. Furthermore, Nelson (2016) and Palisoc, Matsumoto, Ho, Perry, Tang, and Ip (2017) discovered that grit correlates with academic success in a statistically insignificant way. Similarly, Bazelais, Lemay, Doleck, Hu, Vu, Yao (2018) found that neither grit nor mindset was associated with academic success.

People's belief in their capabilities, belief in the influence of external factors, and how they perceived their experiences may in part determine their effort to pursue their goals. Duckworth, Peterson, Matthews, & Kelly (2007) recommended future research on how grit relates to other possible predictors of achievement, such as self-efficacy (Bandura, 1977).

According to Vanhaltren (2016), among nine of the most commonly researched psychological constructs, self-efficacy was the most stable, sole variable for predicting students' academic achievement and performance. The conviction in one's capacity to productively complete a task is called self-efficacy (Bandura, 1977). As an additional construct to the Social Learning Theory (Bandura, 1994; Pajares, 2002), human action and success were perceived to depend on how profound the interaction is between one's thought and action (Yusuf, 2011). Bandura (1994) noted that people's behavior could often be better predicted by their convictions in their own competence and capacity than by what they were capable of performing. Empirical evidence of several research findings have shown its effect on academic performance, wherein it was significantly correlated with performance (Koseoglu, 2015); was the strongest predictor of performance (Chang & Chien, 2015; and Goulao, 2014); and has the highest statistical significance on academic performance than academic motivation and learning strategies (Yusuf, 2011). In the study of Atoum and Al-Momani (2018), self-efficacy was significantly influenced by academic achievement indicating a reciprocal self-efficacy-performance relationship (Bandura, 1997; Pintrich, 2003). Students considered to be cream of the crop produced better beliefs about their capabilities and ability to perform various tasks.

Based on the examination of previous studies conducted, the relationship between grit and academic performance as a predictor is inconclusive. Academic performance may not be clearly linked with grit, but grit is considered essential for later life success, happiness, and life satisfaction. Duckworth, Peterson, Matthews, & Kelly (2007) found that one out of every twenty cadets drops out during the summer of training before the first academic year in West Point Military Academy. They discovered that, among the other variables studied, grit was the best predictor of which cadets would stick it out through the first tough summer. The study of Khan and Khan (2017) revealed that professionals with a high level of grit also had a high level of happiness and that if a person's grit is high, he or she is also satisfied with life.

This study was carried out to respond to Duckworth, Peterson, Matthews, & Kelly's (2007) recommendation. The author looked into the role of grit and academic self-efficacy in predicting academic performance. Specifically, it sought to:

1. Determine the respondents' academic performance, grit, and academic self-efficacy;
2. Determine the degree to which the respondents' grit and self-efficacy predict academic performance.

2 MATERIALS AND METHODS

The study used a descriptive-correlational design with 303 senior high school students drawn from a population of 664 students at Carmen and Cantumog National High Schools through convenience sampling. Three hundred twenty-two students responded at first, but the questionnaires with missing data, on the other hand, were not included in the study. The study setting was chosen because it is where the author works and lives, making it easier to collect the necessary information.

For ethical considerations, the author informed the parents during the Quarterly Parents-Teacher Conference that a study on senior high schools' academic performance, academic self-efficacy, and grit will be performed. Their children are invited to participate. If their children are under 18, their permission is needed for them to participate in the study. The Parental Consent Form was then handed out to the parents. The aim of the study was clarified to ensure that their children's safety was not jeopardized. In addition, parents were informed that their children's responses to the survey would not be linked to their names but instead would be coded. Prior to the survey being administered, the students were given an informed consent form to fill out. At the same time, the author describes the study's

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purpose and emphasizes that their participation is entirely voluntary and has no impact on their grades. If they change their minds, they may withdraw their participation at any time. Finally, the author assured them that their answers would be kept private and respects the forms' privacy throughout the study.

Students responded to standardized research questionnaires that measure their grit and self-efficacy. The Grit Questionnaire developed by Duckworth, A., Peterson, C., Matthews, M., & Kelly, D. (2007) contains 17 statements. Of the 17 statements, six items measure the consistency of interest, another six items measure perseverance of effort, and five items measure ambition. The Self-Efficacy Questionnaire developed by Gaumer, Erickson, Soukop, Noonan, & McGurn (2016) contains 13 items that gauge students' proficiency in two fundamental elements of self-efficacy, which are: 1) Belief that ability can grow with effort, and 2) Belief in the students' ability to meet specific goals or expectations. For both questionnaires, the students will respond with 5 as very much like me, 4 as mostly like me, 3 as somewhat like me, 2 as not much like me, and 1 as not like me at all. The highest score for both questionnaires is 5 (Extremely gritty/ highly efficacious), and the lowest is 1 (Not at all gritty/ Not at all efficacious). Academic performance was measured using the average grade during the first semester of the school year 2017-2018, which was obtained from the class advisors with the consent of both parents and students. DepEd Order No. 73, series of 2012 was the basis for interpreting students' grades. Before obtaining data, the author sought permission to conduct the study from the Principals of Cantumog and Carmen National High Schools.

Statistical Package for the Social Sciences was used to analyzed data. Descriptive statistics was used to obtain the average grade, grit, and self-efficacy scores. Pearson Correlation Coefficient was utilized to determine the relation of grit to academic performance; and academic self-efficacy to academic performance. With grit and self-efficacy as predictor variables of academic performance, a multiple regression analysis was performed. Furthermore, assumptions of normality, linearity, homoscedasticity, and absence of multicollinearity were checked.

3 RESULTS AND DISCUSSION

Table 1 reveals students' over-all academic performance is proficient with m = 86.86, SD = 3.31. This entails that the students have acquired the fundamental skills, experience, and core understanding, which they can put into practice by completing real-world tasks. Among the students in the various SHS track, students specializing in STEM (Science, Technology, Engineering, and Mathematics) strand have the highest academic performance with m = 89.47, SD = 2.23, which is proficient. While students specializing in EIM (Electrical Installation and Maintenance) are considered to be approaching proficiency with m = 83.19, SD = 4.00.

Table 1. Students' Academic Performance

	$\overline{X}$	σ	*Interpretation*
TVL – Electrical Installation & Maintenance	83.19	4.00	Approaching Proficiency
TVL – Cookery	85.15	3.63	Proficient
TVL – ICT	85.92	2.42	Proficient
TVL – Dressmaking	87.24	2.72	Proficient
Academic Track - HUMSS	87.61	2.39	Proficient
Academic Track – General Academic Strand	87.88	4.19	Proficient
Academic Track – ABM	88.10	1.74	Proficient
Academic Track – STEM	89.47	2.23	Proficient
Students' Over-all Academic Performance	**86.86**	**3.31**	**Proficient**

As shown in table 2, students' over-all grit and self-efficacy scores are above-average, with m = 3.40, SD = 0.29 and m = 4.00, SD = 0.46, respectively. The highest and lowest scores on the grit subscale are in ambition (m = 3.95, SD = 0.58) and consistency of interest (m = 2.53, SD = 0.57). This suggests that the respondents are persistent, which backs up Schneider and Stevenson (2001) claims that 21st-century teenagers are optimistic but aimless due to a lack of direction. It may be due to

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their varying levels of interest.

Table 2. Students' Grit and Self-Efficacy Scores

	$\bar{X}$	σ
Grit Subscales		
Ambition	3.95	0.58
Consistency of Interest	2.53	0.57
Perseverance of Effort	3.80	0.58
Over-all Mean Grit Score	3.40	0.29
Self-Efficacy Subscales		
Belief that Ability can Grow with Effort	4.15	0.46
Belief to Meet Specific Goals and/ or expectations	3.82	0.56
Over-all Mean Self-Efficacy Score	4.00	0.46

Table 3. Summary Statistics, Correlations and Results from the Regression Analysis

	$\bar{X}$	σ	*Correlation with Performance*	*b*	R^2	*F*
Students' Academic Performance	86.8563	3.3127		75.464		
Students' Grit	3.3955	0.2879	0.224**	0.696	0.123	21.062**
Students' Self-Efficacy	4.0020	0.4635	0.347**	2.256		

Furthermore, the students scored higher on believing that ability would improve with effort subscale of self-efficacy with m = 4.15, SD = 0.46. There may be a link in the students' scores on the grit subscale of perseverance of effort (m = 3.80) to their belief in achieving specific goals or expectations (m = 3.82). It could mean that how much work they put in to accomplish a mission is primarily determined by the goals they set for themselves.

As proposed by some authors, adolescence is a stage of more cognitive and emotional reactivity, primarily due to the changes accompanying puberty (Forbes & Dahl, 2010; Forbes, et. al., 2010; Hashmi, 2013). In turn, these changes influence how an individual process information and makes decisions (Blakemore and Robbins, 2012; Lerner, et. al., 2015). But it is also during this stage that adolescents develop the ability to make plans or prepare for events that are more distant in time (Barkley, 1997). It is also viewed as a stage where adolescents undergo metamorphosis in seeing themselves as distinct individuals apart from their families yet unable to outline their civic personality. In Erikson's Psychosocial Stages (1968), he points out that the adolescent stage is a stage of exploration and discovery for adolescents to develop a sense of self and personal identity. In this process, they swerve from one pursuit to another. Since the daily life of humans is full of conflict, such as gratifying immediate desires versus delaying gratification for long term-goals (Duckworth and Gross, 2014), the development of self-regulation from the early stages of life is necessary to direct behavior towards goal achievement (Hoffman, et. al. 2012).

A multiple regression analysis was conducted using grit and self-efficacy as predictor variables of academic performance. The descriptive statistics and findings are summarized in Table 3. Students' grit (R^2 = 0.0501, p.01) and self-efficacy (R^2 = 0.1204, p.01) positively and significantly correlated with academic performance, as seen in the table. This means that students who score high on grit and academic self-efficacy are more likely to excel academically. These students accept demanding tasks, exhaust effort, and engage in the mastery of a subject matter through practice. They exhibit the

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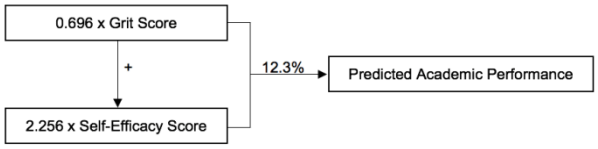
characteristics of a self-regulated learner who uses self-regulating mechanisms such as goal setting, self-evaluation, and self-monitoring to maintain control over their learning (Snyder, 2000). Their academic success is a reflection of not only their effort and self-confidence, but also of how they use cognitive and metacognitive techniques to succeed in difficult circumstances (Ommundsen, Haugen, & Thorleif, 2005 & Busato, Prins, Elshout, & Hamaker, 2000 in Koseoglu, 2015). The result is consistent with the studies of Atoum & Al-Momani (2018), Beyhan (2016), Koseoglu (2015), Chang & Chien (2015), Goulao (2014), and Yusuf (2011).

Moreover, the multiple regression model for student academic success provided F (2, 300) = 21.062, p.01, and $R^2 = 0.123$ when the two predictors were taken into account. Table 3 shows that students' grit and self-efficacy predicted academic performance statistically significantly. Among other factors that may be associated with academic performance, grit and self-efficacy influenced 12.3 percent of the variance in academic performance of senior high school students. In this study, the equation to predict academic performance based on students' grit and self-efficacy takes the following general form:

Predicted Academic Performance = 75.464 + 0.696 (grit score) + 2.256 (self-efficacy score)

Figure 1. Conceptual Model of Grit and Self-Efficacy as Predictors of Academic Performance



An illustration of the predictive strength of grit and self-efficacy in academic performance is shown in Figure 1. In comparison to grit ($R^2 = 0.0501$), self-efficacy ($R^2 = 0.1204$) appears to be a stronger predictor of academic performance. While intelligence plays a role in academic performance, acquiring the can-do attitude is a better predictor of having a higher academic performance. Having grit is a bonus. According to Bandura (1977) Individuals expect difficulties in projects they considered undertaking. If a person believes the task's obstacles are greater than his or her ability, he or she is more likely to give up on the task or stop participating in similar tasks in the future. In contrast, if a person believes his or her abilities are greater than the perceived obstacles, he or she is more likely to stick with the tasks. Hence, the development of self-efficacy should go hand in hand with grit.

Bandura (1986) identified four experiences that are crucial in the development of a person's self-efficacy. According to him, mastery experiences are the first and most powerful of these experiences. A person will gain mastery experience when he/ she has successfully completed a behavior, attempts the task again, and succeed. The second most potent developer of self-efficacy is vicarious experience which involves watching another person successfully perform a task. When assessing vicarious experiences, Bandura outlined several important factors to consider. For example, the more similar the observing person perceives himself to be to the experienced individual, the more robust the vicarious experiences are. The third self-efficacy builder defined by Bandura (1986) is social persuasion, which refers to the influence of others on one's self-efficacy. The principle of social persuasion states that if a person receives verbal reinforcement from someone in their community, their self-efficacy will increase. Bandura's final self-efficacy builder, physiological and emotional states, recognizes the role of internal conditions in a person's self-efficacy.

The result of this study makes an essential contribution in the field of education, specifically in attaining educational outcomes such as academic performance. School-related experiences make up a large part of students' lives and shape the path to significant life outcomes. It is recommended that teachers pay more attention to their students' perceived academic self-efficacy and grit. These factors can affect their effort and persistence in performing a given task. To cultivate self-efficacy, it is vital to provide learning contexts that enable students to connect with and obtain the necessary knowledge and skills. Give instructional activities relevant to their needs and interests, encourage the use of metacognitive strategies, and practice self-evaluation. Capitalizing on small positive experiences can help students develop positive attitudes and values about themselves and their abilities (Atoum & Al-Momani, 2018). These small victories will lead to mastery and will serve as stepping stones for an even greater goal. Teachers are also encouraged to provide frequent, focused, and realistic feedback, which students can use as a basis for self-improvement. To keep students motivated towards accomplishing the task and reinforcing the action, teachers are recommended to compliment students. Finally, rather than dwelling on what should be learned, teachers should also emphasize the process of learning. Simply asking students what to learn and why it is necessary will not make learning meaningful to them. Meaningful learning, on the other hand, necessitates a paradigm shift of the teaching-learning process. As role models, teachers are encouraged to strive for and advocate love for learning. When learning becomes enjoyable and pleasurable, levels of intrinsic interest will increase. Students will not perform tasks solely to receive a grade, and they will not

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limit themselves to completing a simple task but will initiate further steps beyond their target objectives. Consequently, students will most probably persevere and gain the confidence that everything is possible, and then he or she becomes more open to challenges.

The nation has to deal with numerous challenges, like feeding an ever-increasing population (Ardales, 2011). According to the Asian Development Bank in 2015, among Southeast Asian countries, the Philippines ranked third to have a population who lived below the national poverty line. The average monthly income needed to meet basic food and non-food needs among Filipinos was PHP 10, 481. Women account for half of the world's population and 70 percent of the world's poor. Even though they make up 70 percent of the world's working hours, they only earn 10 percent of the world's income resulting in greater poverty, slower economic growth, and a lower standard of living ("Is empowering women", 2013.). As such, agricultural education institutions are strategically positioned to address food and agriculture-related challenges for sustainable development. The author recommends future research endeavors to evaluate the agricultural education curriculum's applications in real-life scenarios and determine its impact on the development of students' capabilities in relation to self-efficacy and grit to train them to be critical thinkers and problem solvers in society.

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