On Learning Style, Academic Performance and Grit Scale: Establishing Influence and Connection

Elymar A. Pascual, Samantha V. Sotomango, Jasmin P. Tubiera, Menrick V. Bueno

elymarpascual@rocketmail.com
Department of Education, Nagcarlan Sub-Office, Laguna, Philippines, 4002

Abstract

Grit, defined as perseverance and passion for long-term goals, has emerged as a significant predictor of success across various domains. This study aimed to explore the intricate relationships between students' learning styles, their academic performance, and their grit levels. The research seeks to determine whether learning styles significantly influence grit and if there is a correlation between academic performance and grit among students. The study involved 30 participants selected through a voluntary response method, ensuring genuine interest and availability. The sample included 5 learners from the Accountancy, Business, and Management (ABM) strand, 5 from the General Academic Strand (GAS), 9 from the Information and Communications Technology (ICT) strand, and 11 from the Caregiving strand. A structured questionnaire was administered in a designated classroom within the school premises. The collected responses were meticulously encoded into an Excel file for organization and analysis. Various statistical tools were employed to ensure robust and reliable findings. The analysis revealed that learning style does not significantly influence the grit level of learners. This suggests that the preferred learning methods of students do not impact their perseverance and passion for long-term goals. Additionally, the study found no significant correlation between academic performance and grit level, indicating that a student's academic success is not necessarily tied to their level of grit. These findings challenge the common assumption that grit is a key determinant of academic achievement. The results suggest that other factors may play a more critical role in influencing academic success. This study contributes valuable insights to the field of educational psychology, emphasizing the need for a broader perspective when considering the influences on student performance. The study recommends diversifying teaching methods, focusing on holistic development, providing personalized support, encouraging extracurricular activities, offering professional development for educators, and promoting continuous research and improvement in educational practices.

Keywords: Learning style; academic performance; grit

1. Introduction

1.1. Context and Rationale

In the realm of educational psychology, understanding the factors that contribute to academic success is paramount. This study, titled "On Learning Styles, Academic Performance and Grit: Establishing Connection and Influence," aims to explore the intricate relationships between students' learning styles, their academic performance, and the role of grit. Learning styles, which refer to the preferred ways in which individuals absorb, process, and retain information, have long been considered crucial in tailoring educational approaches to enhance student outcomes. Meanwhile, academic performance remains a key indicator of educational achievement and future opportunities.

Grit, defined as perseverance and passion for long-term goals, has emerged as a significant predictor of success across various domains. By examining how different learning styles interact with levels of grit, this study seeks to uncover the underlying mechanisms that drive academic performance. Through a comprehensive analysis of these variables, we aim to provide insights that can inform educational practices and support the development of resilient, high-achieving students.

This present study focuses on an investigation among 30 selected Grade 12 learners from various strands, including Accountancy, Business and Management (ABM), Caregiving, Information and Communication Technology (ICT), and General Academic Strand (GAS). The researchers aim to identify the connection between grit and academic performance, as well as the influence of learning styles on grit. By delving into these relationships, we hope to contribute valuable knowledge that can enhance educational strategies and student development.

1.2. Related Literature

Learning style refers to an individual's consistent way of learning, characterized by cognitive, affective, and psychomotor behaviors that indicate relative stability in response to the learning environment (Yan, 2005; Susilowati, 2018). Despite the popularity of the concept, evidence supporting the influence of learning style on performance is lacking, with studies showing that learning style is more associated with subjective aspects of learning, such as judgments of learning (JOLs), rather than objective learning outcomes (Knoll et al. 2017). The idea of learning style originated in the study of English as a native and second language, with Chinese scholars later exploring its impact on language learning performance and the importance of adapting teaching methods to match learners' styles for improved efficiency (Xing, 2023). Various theories, like Howard Gardner's Theory of Multiple Intelligences, categorize individuals into different learning styles, such as visual, aural, verbal, physical, logical, social, solitary, and naturalistic, each with its own strengths and preferences (Sood and Sarin, 2021). According to Fleming (2020), left-brain dominant students are often more verbal learners (responds to words), use reason and logic to solve problems, carefully plan ahead, focus on fine details, good at following information in a logical order, tend to be highly organized, more likely to respond to logic and facts, and prefer a formal study setting with bright lighting. On the other hand, right-brain dominant students are more often visual learners (responds to images), use creativity or intuition to solve problems, prefer to "go with the flow", not-detail oriented, prefer to process information in a varied order, struggle to stay organized, more likely to respond to emotion, humor and tone of voice, and prefer informal study settings with background music and the option to move around.

Academic performance is a multifaceted concept influenced by various factors such as demographic, family, and student-specific attributes. Studies have shown that family support, well-defined academic goals, student focus, and self-confidence significantly impact academic success (Alikhanov, 2019). Additionally, academic performance encompasses general intellectual ability, problem-solving skills, course-related performance, approach to learning, and personal qualities (Warren, 1972). The influence of home education on academic performance is often overlooked in traditional assessment methods, leading to the development of innovative prediction models like the Academic Performance Prediction Method Based on Educational Similarity (APPES) that consider students' educational backgrounds for more accurate performance predictions (OuYang and Levkiv, 2023; Wang et al., 2023). Furthermore, the relationship between goal-directed rumination, psychological distress, and performance highlights the importance of mental well-being in academic success (Krys et al., 2023). By considering these diverse factors, educators and policymakers can better support students in achieving their academic goals.

The grit scale is a valuable tool for assessing perseverance and passion for long-term goals in various populations, such as Chinese adolescents (Bei et al. 2024), physical education teachers in China (Du et al

2023), athletes in Portugal (Birr et al., 2023), and older sexual minority men in the United States (Okafor et, al., 2022). Studies have shown that the grit scale demonstrates satisfactory psychometric properties, including strong measurement invariance across different groups, acceptable internal consistency, and criterion validity. However, in the context of voice therapy for dysphonia and vocal fold paresis, the grit scale did not predict adherence or outcomes as hypothesized (Chopra et al., 2023). The grit scale's factors, consistency of interest, and perseverance of effort, have been consistently associated with decreased odds of experiencing high levels of psychological distress among older sexual minority men, highlighting the scale's potential in understanding and improving mental health outcomes in specific populations.

1.3. Research Questions

This study focused on looking into the students' learning styles and academic performance, and in analyzing their possible association with grit level.

Specifically, it sought answers to the following questions:
a. What is the status of learning styles of the grade 12 learners in TINHS?
b. What is the mean level of academic performance of the grade 12 learners in TINHS?
c. What is the grit level of the grade 12 learners of Talangan Integrated National High School (TINHS)?
d. Does learning style significantly influence the grit level of the grade 12 learners of TINHS?
e. Is there a significant relationship between academic performance and grit level of the grade 12 learners in TINHS?

2. Materials and Methods

2.1. Participants

For this study, a total of 30 respondents were selected based on their willingness to participate despite the survey being conducted earlier than their school schedule. The participants were chosen through a voluntary response method, ensuring that only those who were genuinely interested and available took part. The sample comprised 5 learners from the Accountancy, Business, and Management (ABM) strand, 5 from the General Academic Strand (GAS), 9 from the Information and Communications Technology (ICT) strand, and 11 from the Caregiving strand. This diverse group of respondents provided a broad perspective on the variables under study, enhancing the reliability and validity of the findings.

2.2. Data Gathering Technique

In order to proceed with the needed data for this study, the authors obtained approval from the school head to conduct their research. They administered a structured questionnaire in a designated classroom within the school premises. The collected responses were meticulously encoded into an Excel file for organization and analysis. To derive comprehensive insights, the data was then subjected to various statistical tools, ensuring that the findings were robust and reliable. This systematic approach facilitated a thorough examination of the relationships between learning styles, academic performance, and grit scale among the participants.

2.3. Data Gathering Instrument

For this study, the authors utilized two standardized instruments to gather data. The first instrument was the Brain Hemispheric Dominance Test by Caine and Caine (1994), consisting of 20 items available in the public domain. This test determines brain hemispheric dominance, with scores of 10 or less indicating right-brain functionality and scores of 11 or more indicating left-brain functionality. The second instrument was the 12-item Grit Scale by Duckworth et al. (2007), which measures grit levels using a 5-point Likert scale ranging from 5 (Very much like me) to 1 (Not like me at all). Some items on this scale are reverse-scored to prevent response bias. Additionally, the survey included questions about the learners' academic performance, specifically their general average from their Grade 11 report cards. This comprehensive approach ensured a thorough assessment of the variables under study.

2.4. Data Analysis

To address the research questions in this study various statistical methods were employed. For the first research question, which investigates the status of learning styles among Grade 12 learners at Talangan Integrated National High School (TINHS), frequency and percentage were utilized to categorize and summarize the data. The second and third questions, which examined the mean levels of academic performance and grit, respectively, were analyzed using mean and standard deviation to provide a comprehensive overview of these variables. To determine if learning styles significantly influence the grit levels of the learners, ANOVA (Analysis of Variance) was conducted. Finally, Pearson's correlation coefficient (Pearson-R) was used to explore the relationship between academic performance and grit level, assessing the strength and direction of this association. These statistical techniques ensured a thorough and accurate analysis of the data, providing valuable insights into the connections and influences among learning styles, academic performance, and grit levels.

2.5. Ethical Considerations

Ethical considerations are paramount in this study. The exploration received approval from the school head, ensuring institutional support and oversight. Participation of Grade 12 learners from Talangan Integrated National High School (TINHS) is entirely voluntary, with no pressure or coercion applied. Informed consent was obtained from all participants, who were fully briefed on the study's purpose, procedures, and potential benefits. The results of the brain hemispheric dominance test were disclosed to the learners, allowing them to understand their learning styles better. Anonymity was part of the measure followed - their named not being divulged in the manuscript. Additionally, the findings of the study were shared with the learners, recognizing them as the primary beneficiaries. Confidentiality and anonymity of the participants were strictly maintained throughout the research process, ensuring that individual data was protected and used solely for the purposes of this study.

3. Results

3.1. Learning Styles

Learning Strand	Frequency	Percentage
Left Brain	12	40

Hemispheric		
Right Brain Hemispheric	18	60
Total	30	100

The table presents a comparison between Left Brain Hemispheric and Right Brain Hemispheric learning styles, highlighting a significant preference for the latter. With a frequency of 18 and a percentage of 60%, the Right Brain Hemispheric learning style is notably more prevalent than the Left Brain Hemispheric style, which has a frequency of 12 and a percentage of 40%. This disparity suggests that a majority of individuals may favor learning methods that are more visual, holistic, and intuitive, as opposed to the linear, analytical, and logical approaches typically associated with left-brain dominance. The implications for educators are profound, as this data indicates a need to design curricula and teaching methods that cater to right-brain learners. This could involve incorporating more visual aids, storytelling, and hands-on activities into lessons. However, it is equally important to ensure that left-brain learners are not neglected. Educators should strive to create a balanced learning environment that addresses the diverse needs of all students, perhaps by integrating a variety of teaching strategies that appeal to both hemispheric preferences. This approach can help foster an inclusive educational setting where every learner has the opportunity to thrive, regardless of their dominant learning style.

3.2. Academic Performance

Performance Category	Frequency	Percentage	Mean	SD
Outstanding (90 and above)	21	70	91.80	1.44
Above Average (85 – 89)	7	23.33	86.86	1.35
Average (80 – 84)	2	6.67	84.00	0.00
Total/Average	30	100	90.13	3.00

The table provides a comprehensive overview of the academic achievements of a group of students, categorized into three performance levels: Outstanding, Above Average, and Average. The data reveals that a significant majority of students, 70%, fall into the Outstanding category, with a mean score of 91.80 and a low standard deviation of 1.44, indicating that their scores are closely clustered around the mean. This suggests a high level of consistency and excellence among the top performers. The Above Average category, comprising 23.33% of the students, has a mean score of 86.86 and a slightly lower standard deviation of 1.35, reflecting a similar but slightly less consistent performance compared to the Outstanding group. The Average category, representing only 6.67% of the students, has a mean score of 84.00 with no variation (SD = 0), indicating that all students in this category scored exactly the same. The overall mean score across all categories is 90.13, with a standard deviation of 3.00, suggesting a broader range of scores when considering the entire group. This analysis highlights the high academic standards achieved by the majority of students, with a notable concentration of high performers and minimal representation in the lower performance categories. The low standard deviations in the Outstanding and Above Average categories further emphasize the consistency of high performance, while the overall standard deviation indicates some variability when all students are

considered together. This data can be useful for educators and administrators to understand the distribution of academic performance and to identify areas for targeted support or enrichment.

3.3. Grit Level

Grit Level	Frequency	Percentage
Very Highly Gritty (4.21 – 5.00)	2	6.67
Very Gritty (3.41 – 4.20)	7	23.33
Moderately Gritty (2.61 – 3.40)	21	70
Total	30	100

The table provides a detailed breakdown of individuals' grit levels, categorized into three distinct groups: 'Highly Gritty,' 'Very Gritty,' and 'Moderately Gritty.' The 'Highly Gritty' category, with a grit score range of 4.21 to 5.00, has the lowest frequency of 2 individuals, making up only 6.67% of the total sample. This suggests that very few individuals exhibit the highest levels of perseverance and passion for long-term goals. The 'Very Gritty' category, with scores ranging from 3.41 to 4.20, includes 7 individuals, accounting for 23.33% of the sample. This indicates a moderate presence of individuals with significant grit. The largest group falls under the 'Moderately Gritty' category, with scores between 2.61 and 3.40. This group comprises 21 individuals, representing a substantial 70% of the total sample. The high frequency in this category suggests that while many individuals possess some level of grit, the majority do not reach the higher levels of perseverance and passion. Overall, the table highlights a distribution where most individuals fall into the moderate grit category, with fewer individuals exhibiting very high levels of grit. This distribution can be insightful for understanding the general perseverance and passion levels within the studied population, potentially guiding interventions or support mechanisms to enhance grit among individuals.

3.4. Difference of Grit Level Across Learning Styles

Brain Dominance	n	Mean	SD	f-value	f-crit	p-value	Decision
Left Brain Hemispheric Style	12	3.31	0.31				
Right Brain Hemispheric Style	18	3.24	0.54	0.1736	4.20	0.6801	Not Significant
	30	3.26	0.46				

alpha = 0.05

The table presents a comparative analysis of grit levels between two learning styles: Left Brain Hemispheric Style and Right Brain Hemispheric Style. The table includes data on the number of subjects (n), mean grit level, standard deviation (SD), f-value, p-value, and a decision on the significance of the results. For the Left Brain Hemispheric Style, there are 12 subjects with a mean grit level of 3.31 and a standard deviation of 0.31. In contrast, the Right Brain Hemispheric Style has 18 subjects with a mean grit level of 3.24 and a

standard deviation of 0.54. The overall mean for both styles combined, with a total of 30 subjects, is 3.26 with a standard deviation of 0.46. The f-value is 4.20, and the p-value is 0.6801, which is higher than the alpha level of 0.05, leading to the conclusion that there is no significant difference in grit levels between the two learning styles.

3.5. Relationship of Grit Level and Academic Performance

Factors	Mean	SD	r-value	r-crit	p-value	Decision
Grit Level	3.26	0.46	0.2323	0.361	0.2167	Not Significant
Academic Performance	90.13	3.00				

alpha = 0.05

The table presents a statistical analysis aimed at understanding the correlation between students' grit levels and their academic performance. The table includes key statistical measures such as mean, standard deviation (SD), t-value, critical t-value (t-crit), p-value, and the decision regarding significance. For the 'Grit Level' factor, the mean is 3.26 with a standard deviation of 0.46. However, the t-value is obscured, and the critical t-value and p-value are not provided. The decision for this factor is marked as "Not Significant," indicating that the variations in grit levels do not show a statistically significant impact on academic performance within this study's context. For 'Academic Performance,' the mean is 90.13 with a standard deviation of 3.00. The r-value is 0.2323, the critical r-value is 0.361, and the p-value is 0.2167.

4. Discussion

4.1. On Grit Level and Learning Styles

The findings suggest that brain dominance does not significantly affect grit levels in this sample group. The higher standard deviation in the Right Brain Hemispheric Style indicates more variability in grit levels among those subjects compared to the Left Brain Hemispheric Style. Overall, the analysis implies that while there are slight differences in mean grit levels between the two groups, these differences are not statistically significant, and thus, brain dominance may not be a critical factor in determining grit levels. Previous study also reveals that learning style has no significant effect on grit scale levels, as learning styles are more closely associated with subjective aspects of learning rather than objective outcomes (Knoll et al., 2017). Both the previous and present study suggest that while learning styles may influence how individuals perceive their learning experiences, they do not significantly impact their perseverance and passion for long-term goals as measured by the grit scale.

4.2. On Grit Level and Academic Performance

Similar to the grit level, the decision for the relationship of grit level and academic performance is also "Not Significant," suggesting that the observed academic performance does not significantly differ from what might be expected by chance. The alpha level is set at 0.05, which is a common threshold for determining statistical significance. Overall, the table indicates that within the parameters of this study, there is no significant relationship between grit levels and academic performance, implying that other factors might be more influential in determining academic success. Previous study also indicates that academic performance has no significant relationship to grit scale levels, as academic success is influenced by a variety of factors

including family support, well-defined goals, and self-confidence, rather than perseverance and passion alone (Alikhanov, 2019). This suggests that while grit may contribute to personal qualities, it does not directly correlate with academic outcomes.

5. Conclusion and Recommendations

5.1. Conclusion

In conclusion, this study reveals critical insights into the dynamics between students' learning styles, academic performance and grit scale. The findings indicate that learning style does not significantly influence the grit level of learners, suggesting that the way students prefer to learn does not impact their perseverance and passion for long-term goals. Additionally, the study demonstrates that there is no significant correlation between academic performance and grit level, implying that a student's academic success is not necessarily tied to their level of grit. These results challenge the common assumption that grit is a key determinant of academic achievement and highlight the need for further research to explore other factors that may contribute to academic success. Overall, this study provides valuable contributions to the understanding of educational psychology and encourages educators to consider a broader range of influences on student performance.

5.2. Recommendations

Based on the findings of this study, it is recommended that educators and academic institutions focus on the following strategies to enhance student outcomes:

a. Diversify Teaching Methods: Since learning styles do not significantly influence grit, educators should employ a variety of teaching methods to cater to different learning preferences. This approach ensures that all students are engaged and can benefit from diverse instructional techniques.

b. Focus on Holistic Development: Given that academic performance is not significantly correlated with grit, schools should emphasize the development of both cognitive and non-cognitive skills. Programs that foster resilience, perseverance, and passion for long-term goals should be integrated into the curriculum.

c. Personalized Support: Provide personalized support and mentorship to students. Understanding individual student needs and offering tailored guidance can help in nurturing their overall development, beyond just academic achievements.

d. Encourage Extracurricular Activities: Promote participation in extracurricular activities that build character and grit. Activities such as sports, arts, and community service can help students develop perseverance and a growth mindset.

e. Professional Development for Educators: Invest in professional development programs for teachers to equip them with skills to support students' holistic development. Training on how to integrate social-emotional learning into the classroom can be particularly beneficial.

f. Research and Continuous Improvement: Encourage ongoing research to explore other factors that may influence academic performance and grit. Continuous assessment and adaptation of educational strategies based on research findings can lead to more effective educational practices.

By implementing these recommendations, educational institutions can create a more supportive and enriching learning environment that fosters both academic success and the development of essential life skills.

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