GRIT RELATIONSHIP TO STUDENT GRADE POINT AVERAGE

By

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CERTIFICATION OF THESIS/PROJECT CAPSTONE WORK

We, the undersigned, certify that this project entitled GRIT RELATIONSHIP TO STUDENT GRADE POINT AVERAGE by Jordin Erickson, Candidate for the Degree of Master of Science in Education, Curriculum and Instruction, is acceptable in form and content and demonstrates a satisfactory knowledge of the field covered by this project.
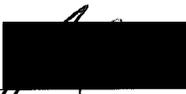
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Abstract

The importance of choosing students for a specific program has been something many specialized schools struggle with. There is little research completed on the relationship between Grit and GPA on middle school aged students. The author collected data on student grade point averages GPA and Grit score from 10th grade students who were enrolled in a dual college high school program. The top 5 performing students and bottom 5 performing students according to GPA were selected for the study. The researcher was investigating if there was a relationship between student GPA and Grit score. The findings showed there was a relationship between Grit and GPA.

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Chapter 1 - Introduction

The importance of student selection for certain program

Student selection into a dual college high school program is important to ensure the

success of the students enrolled. There are many professionals who point out the importance of

student motivation being one of the key factors that make students successful in rigorous

programs that involve the students attending college classes at such a young age. (Tynan-Wood,

2016; Ahlgrim, 2017). A principal of a dual college high school program called Isaac Bear,

Philip Sutton, stated that, '"The most important thing we look for in a potential student is

motivation"' (quoted in Tynan-Wood, para 4). In the following chapter I will describe the

measurement that will be used to gauge student perseverance.

The Project Based Learning Academy is an early college high school specialized project

based learning environment for at-risk students starting in 9th grade. The promotional material

for the program describes it: "This is a six-year commitment for students and their school

districts, as students remain enrolled in their home districts for the four years of high school, plus

an additional two years for the AAS degree. Students completing the program will earn a NYS

Regents Diploma from their home district at the same time they earn an AAS degree from

Jamestown Community College" (PTECH, 2015, p. 2). Because the program is so new, the

rubric for student entrance is in progress. Ensuring student success in the PBL Academy differs

from student success in a traditional high school setting because the students will take college

courses during their high school years. It is important for the school to make sure that students

selected for the program will be able to perform as necessary in order to successfully complete

the program. The PBL Academy has a set of guidelines that include various informal indicators

for whom the program is intended. The PBL Academy is designed, not only to help at-risk

students, but the local economy as well. The program puts students in a specific manufacturing

pathway of their preference, in order to benefit the high need manufacturing industries in

Western New York. Student entrance into the program is intended to be competitive because of

the limited seat space.

The issue within the program is that there are students attending who have the potential to

fail or drop out, not so much due to their abilities, but due to their work ethic. Some students

show a lack of motivation or drive to complete work. My study researched the predictors for

student success or failure within project based learning early college high school settings. I have

studied the characteristics of students who are most likely to succeed in college courses using

related literature. Researching this information will help administrators decide upon the specific

characteristics to look for when choosing appropriate student placement within the program. My

study researched the GRIT Scale as a potential addition for the PBL Academy to add to a rubric

for student entrance into the program. It is important for students to have a strong ability to

persevere in a student centered learning environment such as the PBL Academy. This study is

purposed to see if there is a relationship between student grade point average and the Grit Scale.

The Problem – Selection criteria

Making decisions about allowing students to enter a program is a very difficult task for

public schools. Administrators need to take care in selecting students who will be successful

within a project based learning, early college high school environment. If a student is not

appropriate for the program and is admitted, it could be damaging to that student's future with

graduating high school on time and admittance into future college courses. The problem related

to the topic is there is no formal rubric to decide which students are going to have the most

potential to successfully complete the program. Guidelines for targeted students for the program are listed in the PBL Academy Brochure:

♦ Interest in the real world applications of math and science ♦ Ability to respectfully communicate and work with others ♦ Motivated to learn in a challenging work environment

♦ Interest in using technology to research and acquire new information

♦ Willingness to learn in a nontraditional classroom environment

♦ Desire to learn time management, collaboration and problem-solving skills

♦ Students who want to go to college, but feel they will not

♦ Excellent work ethic

♦ Home District P-TECH commitment. (PTECH, 2015, p. 3)

The PBL Academy is looking to find students who have difficulty fitting into traditional public schools and might not be as popular as the most successful students. The students in the PBL Academy do not have to be the best of the best academically, but they do need to have certain abilities in order to complete the program.

GPA and Student Success

Student GPA has been viewed in the research as a predictor of student success (Bazelais, , & Lemay, , & Doleck , 2016) Bazelais, et al.'s study was meant to find out if there was a "relationship found between grit and student achievement in a gateway college physics course." (p.) The National Education Association (n.d.) listed several indicators of future success, stating that, "GPA has proven successful at predicting future success because of its capacity to capture both cognitive skills and those critical to success (i.e., non cognitive ability)" (p. 2). The article, which focused on about non-cognitive skills, stated that, "skills are critical to academic success:

earning course credits, for example, requires a set of behavioral skills, including self-regulation.

Mastery of such skills has proven predictive of future academic success, without such skills,

changes in cognitive ability may be unlikely. Growth in non cognitive skills has been tied to

increases in course grades and future educational attainment" (p. 7). Non-cognitive skills are part

of student characteristics.

Although some recent articles stated that student GPA is not a strong indicator of student

success, O'Shaughnessy (2014) reported that "A newly released landmark study strongly

suggests that students who have strong grade point averages in high school are likely to do well

in college -- even if their standardized test scores are poor" (p. 1). This is an interesting

statement because there is so much emphasis on standardized test scores. This is also relevant to

student success within the PBL Academy because the students will be starting college courses in

their 10th grade year. Research has been done in order to find out if the students in the PBL

Academy who are most successful and the students who are least successful according to GPA

have a relationship between their GRIT Scores and grade point averages.

Perseverance and Student Success

According to the Webster's Dictionary website, the definition of perseverance is

"continued effort to do or achieve something despite difficulties, failure, or opposition." (N.A.,

n.d.) There are many articles that provide evidence of student characteristics that produce

student success. In order for these students to be successful within an early college high school

program, the students need to have the ability to complete college courses, or at least potential

and perseverance to achieve the ability. Grit is defined as "perseverance and passion for long-

term goals. Grit entails working strenuously toward challenges, maintaining effort and interest

over years despite failure, adversity, and plateaus in progress." (Duckworth, Peterson, Matthews,

& Kelly, D. R. (2007) Overall, students must at least have the ability to try in the PBL Academy because this school is not able to push students through the college entrance exams, and is not able to change college grades once the students make it to that level.

Interest Statement

I am currently working in the PBL Academy as a teaching assistant. I am gathering data on the top and bottom student performance according to GPA to see if there is a relationship between student GPA and the Grit Scale. I am very interested in having a better understanding of what makes students better candidates for succeeding in the project based learning environment that the PBL Academy provides. I am seeing that there are some students who have a lower work ethic and lack of desire to complete tasks in general. I am curious about what can be added to filter these students out of being accepted into the PBL Academy. It's not that I think the students shouldn't be given the opportunity to have that kind of education, but I don't think this program is for everyone. Students who do not succeed in the PBL Academy will fall far behind their peers. I care about all students' education, and I want to see students succeed. I feel that, even if students have a difficult time with academics, if they have the perseverance, they will be able to succeed in this kind of environment. I am also interested in knowing more about grit and what it measures and if this is a teachable trait. I think that finding out more about the potential relationship between grit and grade point averages will help me to find out about the characteristics I need to instill in students to promote success.

Purpose Statement

The problem is worth studying because it will provide evidence based research for the PBL Academy to add or exclude the Grit Scale from the rubric being created for predicting student appropriateness for the PBL Academy. The research gives administrators of the program

information about the Grit Scale in relation to student grade point averages. Although there was

no relationship found during this study, the study being done with the PBL students is interested

in finding out if there is a relationship with younger students in a project based learning dual

college high school environment.

Conclusion

The contemporary evidence given from multiple sources states that the most successful

students in a dual college high school are motivated to learn. The research also indicated that the

Grit Scale gives educators information about perseverance and student willingness to not give

up. Grade point average was an indicator of student success because of the various ways it

measures student ability, and in order to find out if these two measurements could possibly have

a relationship, research has been done to find out if the student's Grit score can tell us anything

about how successful they are. In the next chapter I will be reviewing the literature related to

Angela Duckworth's Grit Scale. I will also be researching student grade point averages as a

measure for student success according to related literature.

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Chapter 2 – Review of the Literature

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Chapter 1 looked at the contemporary portion of literature that addressed grade point

average, student success, and the Grit Scale. Chapter 1 also found information about claims

made for student success within a dual college high school program. One of the most important

attributes named for student success is motivation. Motivation was also mentioned when

contemporary literature discussed Grit. This chapter will continue to find information about the

Grit Scale and student grade point averages using research from peer reviewed journal articles.

In an initial investigation of using student grade point average (GPA) as an appropriate

measure of success, The National Education Association (n.d.), listing several indicators of

future success, stated that, "GPA has proven successful at predicting future success because of its capacity to capture both cognitive skills and those critical to success (i.e., non cognitive ability)" (p. 2). The article, talking about non-cognitive skills, stated that, "skills are critical to academic success: earning course credits, for example, requires a set of behavioral skills, including self-regulation. Mastery of such skills has proven predictive of future academic success, without such skills, changes in cognitive ability may be unlikely. Growth in non cognitive skills has been tied to increases in course grades and future educational attainment" (p. 7). Non-cognitive skills are part of student characteristics.

Another study finding a relationship between student success and grade point average comes from McKee and Calderella (2016). This study researched 418 Oregon high school students using GPA as one of the factors telling of student success from middle school to high school. "the findings of this study suggest that there is a strong relationship between middle school GPA and high school performance" (p. 525). The study also discussed the phenomenon that students receiving a grade of D were likely to have not mastered material, although they had passed the courses. The grade of D in middle school was the strongest predictor of failure in high school, according to the authors: "Results of this study indicated that the strongest predictor for high school GPA was middle school grades of D, followed closely by middle school GPA and middle school attendance" (p. 525). When students earn a D in class, they have not proven that they have a thorough enough understanding to build upon the information they have learned.

GPA was one of three significant predictors of student success according to Young, Worrel and Gabelko (2011). The authors stated that, "The goal of this study was to identify predictors of mathematics achievement in accelerated and enrichment courses. When examined individually, SES, GPA, mathematics grade, MDT score, and ethnicity (being African American

or Latino) predicted mathematics achievement for accelerated course students. However, only SES, GPA, and MDT score were significant predictors in the combined model" (p. 1). Some professionals claim that non-cognitive skills have more predictive validity of student achievement than test scores and grade point averages. Fusch (2012) agreed that non-cognitive skills are important predictors of student success, and cites Paul Gore, from the University of Utah. Fusch summarizes, from an interview with Paul Gore that, "Historical efforts by admissions officers and enrollment managers to assess a student's potential for high academic performance and academic persistence have focused on cognitive potential, measured most frequently by past academic performance (high school GPA) and standardized test scores (SAT, ACT). Yet there is a growing awareness among enrollment managers (driven and confirmed by the research of recent years) that these two measures, taken by themselves, offer limited predictive accuracy" (p. 1). There are 6 main categories that are suggested by Gore to be evaluated in order to have a more accurate prediction of student success: academic engagement, academic efficacy, education commitment, campus engagement, resiliency and social comfort. Predicting student success is multidimensional. Academic engagement, education commitment, and resiliency are all related to Grit.

Grit and Student Achievement

Some studies found a relationship between student Grit score and GPA. According to Duckworth, "we define grit as perseverance and passion for long-term goals. Grit entails working strenuously toward challenges, maintaining effort and interest over years despite failure, adversity, and plateaus in progress" (p. 1087-1088). A later study that tested grit in relation to GPAs of black male college students at a predominately white institution found that, "Grit (B= 0.04) was a positive predictor of Black males' grades in college, affecting grades

almost as equally as high school GPA." Strayhorn (2013) commented that "grit, alone, added incremental predictive validity over and beyond traditional measures of academic success such as high school grade point average and American College Test scores" (p. 1).

The following study examined student motivation and Grit in relation to student success in a Science Technology Engineering Mathematics school. Pittinsky and Diamante (2015) told readers that one of the major problems with students in a STEM environment is that students mistaken science and mathematics to be fun. This distorted view of science and math being fun contributes to students giving up when they find out that the subject areas are more difficult than expected. The authors commented: "Curiosity and mastery can be powerful intrinsic motivators and what they require is grit — the willingness to press on even when it isn't fun. As an education research construct, grit is undergoing ever more precise definition and experimentation. But it always has existed and always has mattered. Finding ways to encourage kids to stick with something even when it's hard and not much fun would do a lot to reduce the STEM dropout rate in college" (p. 50). Maddi (2012) conducted a study using the United Stated Military Academy that showed that there was a relationship between the 17-point Grit Scale and cadet academic achievement. The cadets were expected to retain academics: "the pressures of cadet life require trainees to adapt to heavy and challenging academic course loads" (p. 20.) the author found that, "The binary logistic regression analysis showed that Whole Candidate Score, hardiness, and grit were each positive factors in retention. But grit had a larger effect than the other two variables" (p. 25). The findings indicate that retention is related to student perseverance and that Grit could be used to predict student retention rates.

Another study involving Grit and student motivation in relation to student success with self-regulated learning was conducted. Wolter and Hussain (2015) conducted a study on self-

regulated learning and grit that showed that students are less likely to procrastinate when they have a higher level of grit. The authors also discussed the findings related to academic success and grit level. Wolters and Hussain commented that, "Findings indicated that both facets of grit were associated with reduced levels of self-reported delays in beginning and completing academic tasks… Our findings make an important contribution by providing initial evidence that students' engagement in SRL may serve as one key pathway through which grit leads to academic success" (p. 305). Gaertner and McClarty (2015) researched performance, perseverance and college readiness with middle school students, stating that they found that, "HSGPA counts as much toward the college readiness composite as SAT and ACT." (p. 24). The study was looking at several traits and forms of assessments with middle school students in order to see which factors best predicted college readiness. The authors concluded that, "A diversity of middle-school variables was synthesized into six factors: achievement, behavior, motivation, social engagement, family circumstances, and school characteristics. Middle-school factors explain 69% of the variance in college readiness, and results suggest a variety of factors beyond academic achievement—most notably motivation and behavior—contribute substantially to preparedness for postsecondary study" (p. 20). These findings suggest that Grit can potentially be used to predict student performance with self-regulated learning.

Duckworth, Peterson, Matthews and Kelly (2007) summarized several studies using the Grit Scale to measure success. Their review concluded that, "Gritty students outperformed their less gritty peers: Grit scores were associated with higher GPAs" (p. 1093.) The study researched by Matthews and Kelly was conducted in Pennsylvania using 139 undergraduate students. The results showed, per SAT scores, that students who had higher SAT scores had less grit than those who performed less successfully. Another study in the same article showed the contrary:

Duckworth, et. al., commented: "grit was not the best predictor of cumulative first-year academic GPA and MPS among cadets who remained at West Point… However, self-control was a better predictor of GPA (r =.13,p<.001) than was grit (r =.06,p<.05)" (p. 1096). This variation of findings shows there could be a situational use for predictive validity using the grit scale as part of entrance into a program.

Conclusions

In the scholarship that I have reviewed above, there is no research about the use of the Grit Scale in relation to middle school students and GPAs. There were no studies found on the Grit Scale in relation to middle school students and their GPAs. There were no studies showing the Grit Scale in relation to student GPAs in a dual college high school. My research study thus attempted to give more information about younger 10th grade students grade point averages in relation to the grit scale. My investigation focused on collecting information about 10th grade students in their second year of a dual college high school program who have not yet completed a full semester course.

Chapter 3 – Methodology

The previous chapters discussed, and introduced, the reasoning for studying the Grit Scale and student grade point averages. I conducted a literature review in order to rationalize the study and to support evidence for conducting the study. This review to suggest that there is a possible relationship between a student's grit and success. The research also showed that students' grade point average is a good measurement of students' success.

Research Frameworks

The reasoning behind investigating the research questions addressed in Chapter 2 is based on the frameworks consistent with quantitative methodologies, "with the goal of obtaining a single true reality, or at least reality with known probabilities, with an emphasis on measurement,

numerical data, control, and objectivity" (McMillan, 2012, p. 11). I designed my research plan

based on measurable numerical values of the 12 Point Grit Scale and student grade point

averages (GPAs). This research gave me clear and concise data and numbers to apply to my

research questions and left little room for bias interpretations.

Participants and Setting

The research of subjects in this study was conducted in a project based learning, dual

college high school program in Western New York – the Project Based Learning (PBL)

Academy. The program started in the fall of 2015. Students selected for the program are "at-risk"

students. The criteria for student selection into the program was not formal for the first selected

group of students into the program. The gentile rubric was previously shown in Chapter 1.

Information about student GPA and motivation using the Grit Scale gives administrators an

answer about the information that the Grit Scale tells us about students and whether the Grit

Scale can be used on the rubric for student acceptance into the PBL Academy. The program

currently does not have a way of making formal decisions about the students to accept into the

program. The administrators need to ensure that, because the program contains college level

courses, the students accepted into the program are capable of, and willing to, complete the work

that is expected.

Conceptual Definitions

The independent variable in this study was the student Grit Scale score. The teacher had

no control over manipulating the score of the Grit Scale. The Grit Scale (See Appendix A) was

completed based on each individual student's perception of himself or herself. The only variance

given was the administration directions of the Grit Scale.

The categorical variable, or "group defined by specific characteristics" (McMillan p. 41.)

were students chosen by their characteristic of GPA. The characteristics that made students

eligible for the study were that they be enrolled in the PBL Academy, be in the 10th grade at the

time of the study, and have the top or bottom 5 GPAs. There were 56 students enrolled in the

program, including 5 female students and 51 male students. The number of students receiving

free lunch is 33. There are 25 10th grade students and 31 9th grade students. There are 3 African

American students, 48 Caucasian students, 1 Russian student, and 3 unknown ethnicities. The

top and bottom 5 students according to grade point averages were all male Caucasian students

and one female student. The one female student was in the top 5 performing according to GPA.

Data Collection Procedures

The researcher collected data on student GPA from the students' third quarter 5-week

grades of their 10th grade year at the PBL Academy. The researcher also gathered data from the

focus group using the 12-point Grit Scale. As mentioned on the Edutopia website, "Using the

Grit Scale that Duckworth developed with Chris Peterson, they found that Grit is a better

indicator of GPA and graduation rates. (IQ, however, is very predictive of standardized test

scores.)"(Davis, 2014, p.1). Again, the purpose of this study was to help pre-determine the

students that are most likely to succeed in an early college high school setting.

This research study investigated student perseverance of the most successful and least

successful students in the PBL Academy who were farthest along in the program. For the

purpose of this study, data was collected for students who ranked least successful and most

successful according to GPA. The 10th grade students were the farthest along in the program, so

those students were selected to participate in the study. The top 5 students according to GPA, and

the bottom 5 students according to GPA were used for the study. Grade point average from 5

week grades of the student's 3rd quarter were used to determine which students participated in the study.

So that the research could be done to protect the students from knowing the study selection criteria, the Grit Scale was administered to all students in the program, both 9th and 10th grade students. The Grit Scale was administered, data gathered, and consent forms given, after receiving approval from the Human Subjects Review. (See Appendix C) The informed consent form used (See Appendix D) in the study was also given to all 9th and 10th grade students.

Data Analysis Procedures

The following section will include information about the dates, times and procedures by which the Grit Scale was administered. Once both Grit Scales were completed by students, the score was given and graphed according to the difference between the academic and non-academic scales compared with the student GPA. The Grit Scale was also compared for those students enrolled in the college class according to their college grade at that time. The school counselor assisted with gathering report card information for the students for GPA data. The school counselor distributed the Grit Scale one classroom at a time, reciting the participation script (see Appendix B). The first Grit Scale administered was given on March 21, 2017. The Grit Scale was given at approximately 12:30pm during the students' 6th period class. The students were given directions for the Grit Scale to be completed based on their academics, inside school activities. The scores were then reported on the top and bottom five students based on grade point averages. The counselor reported that some of the students did not know what the word "diligent," a word included in the last question of the Grit Scale, meant. Definitions and wording were not explained to the students because the counselor did not want to alter the results

and was giving the scale as directed. Students who were absent were given the Grit Scale at a

separate location the following day at various times.

The second Grit Scale was administered on March 30, 2017 at approximately 10:45am.

One of the students not included in the study attempted to use a different student's name when

completing the Grit Scale. The counselor read directions to the students to complete the Grit

Scale according to outside of school activities or projects. There were no students absent on this

day, so the Grit Scale did not need to be administered to anyone after returning from absence.

The scores were recorded for the top and bottom five students according to GPA. All of the study

information listed above was recorded to the best of my knowledge. Since there are no formal

student demographics given on the state website, the information provided was information the

researcher personally documented for the purpose of this study. The Grit Scale scores and

student data were recorded and kept in a safe and secure locked area. Directions were given as

clearly as possible when the Grit Scale was administered.

Conclusion

The quantitative methodologies practiced in this chapter successfully showed the

framework by which the data was collected. The Grit Scale was properly administered on two

separate occasions by the school counselor. The School counselor also provided student GPA

data. All of the data collected was done within one week of each other so that the grades and Grit

scores would be recorded in a timely manner. The formal analysis of the data is reviewed in

Chapter 4.

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Chapter 4 - Results

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The previous chapter discussed the data collection and procedures. The following chapter

will discuss the findings from the data that was collected. The data will be illustrated using

graphs and will be broken down into organized different tables.

The variations between the top 5 and bottom 5 students Grit Scale scores and grade point averages (GPAs) can be seen in the graphs in tables 1, 2, 3 and 4. During the time the data was collected for student GPA, the top 5 students achieved between 86% and 89.5% for their average for 5 week grades during the 3rd quarter of their 10th grade year. The bottom 5 students achieved between 61.8% and 72.17%. The grade point average for the bottom 4 students did not include their college course grade, which was in progress at that time. The in-progress grades for the bottom 4 students, the only students completing a college course at that time, achieved a progress grade between 3.65% and 20.17% for the course.
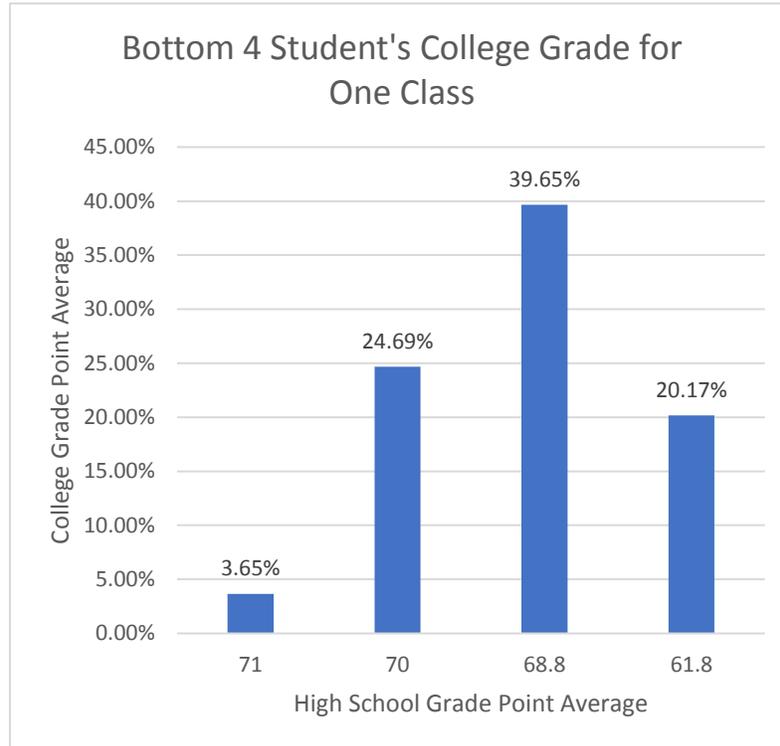
Table 1

Table 1 shows the students out of the bottom 5 students who are taking college courses. There were no top performing students taking any college courses, and the college courses were not factored into the students' overall grade point averages when selecting students for the study. It was a coincidence that the students who were also the lowest performing were taking a college class at the time of the study. The percentage was out of 100% for a college elective course of 3 credits. The college credit scores would not have changed these students being in the bottom performing students for their grade level. The scores, if included in the overall GPAs of students, might have altered the order of their ranking within each other.
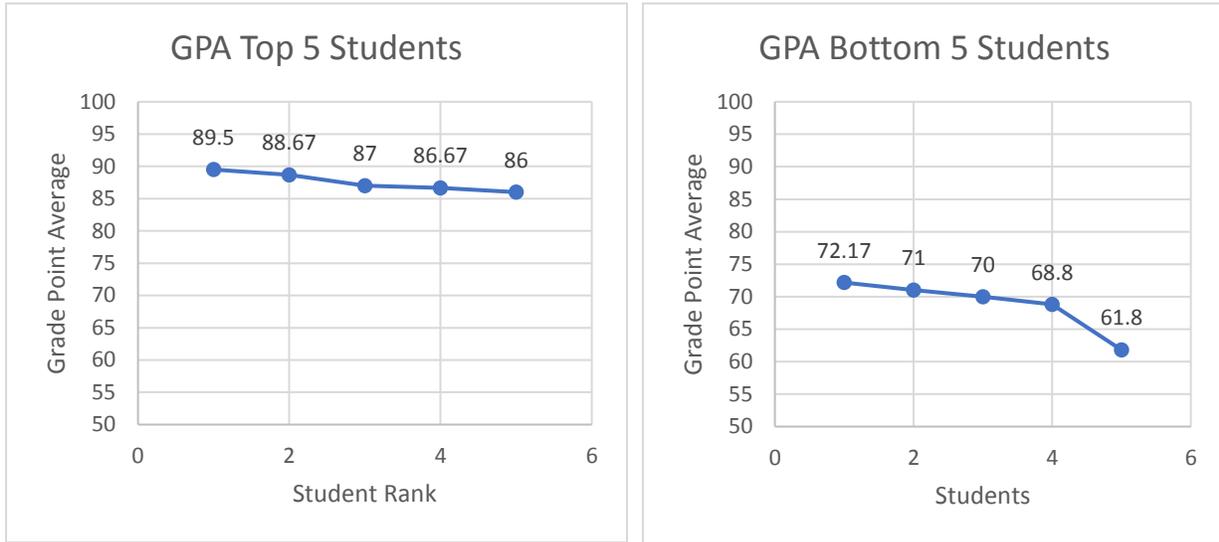
Table 2

Table 2 shows the top 5 students' GPAs. These averages range from 86% to 89.5% for the 5 week grades of the student's 10th grade year at the PBL Academy. The second graph in table 1 shows the bottom 5 students' GPAs. The bottom 5 students' GPAs ranged from 61.8% to 72.2%. The average GPA score for the top 5 performing students was recorded as 87.568%. The bottom 5 student average GPA score was recorded as 68.754%.
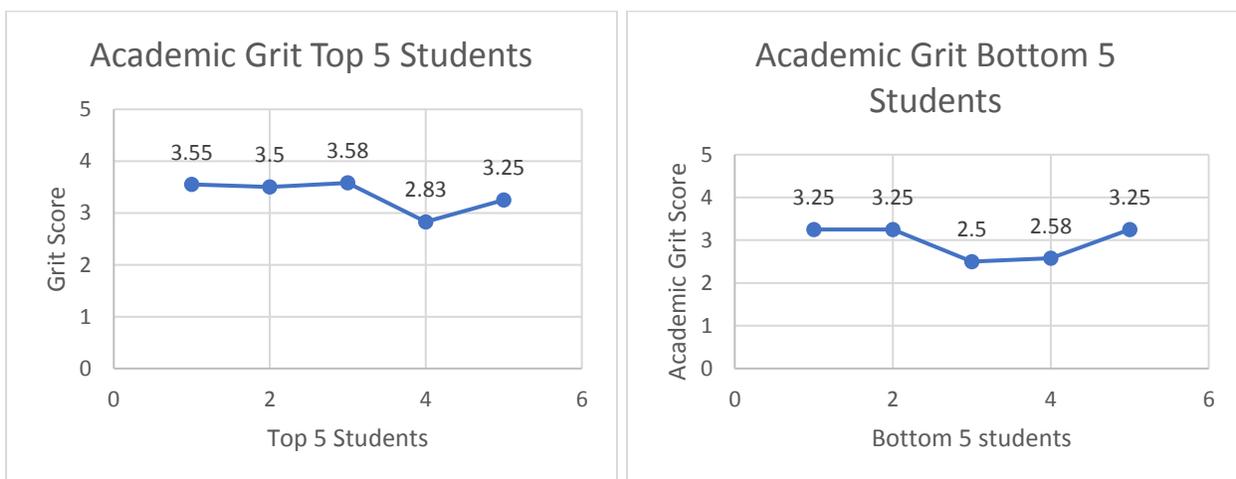
Table 3

Table 3 illustrates student academic Grit scores of the top 5 students and the bottom 5 students according to grade point average in order from highest grade point average to lowest

grade point average. The first graph gives data on the top 5 performing students according to GPA. The second graph gives data on the bottom 5 students according to GPA. The average academic Grit for the top 5 students was 3.342 out of 5. The average academic Grit for the bottom 5 performing students was 2.966 out of 5.

According to the data about the top 5 students, the student with a GPA of 89.5% scored 3.55 out of 5. The student with a GPA of 88.67 scored 3.5 out of 5. The student with a GPA of 87% scored 3.58 out of 5. The student with a GPA of 86.67% scored 2.83 out of 5. The female student with a GPA of 86% scored 3.25 out of 5.

According to the data about the bottom 5 students, the student with a GPA of 72.17% scored 3.25 out of 5 on the academic Grit Scale. The student with a GPA of 71% scored 3.25 out of 5. The student with a GPA of 70% scored 2.5 out of 5. The student with a GPA of 68.8% scored 2.58 out of 5. The student with a GPA of 61.8% scored 3.25 out of 5.
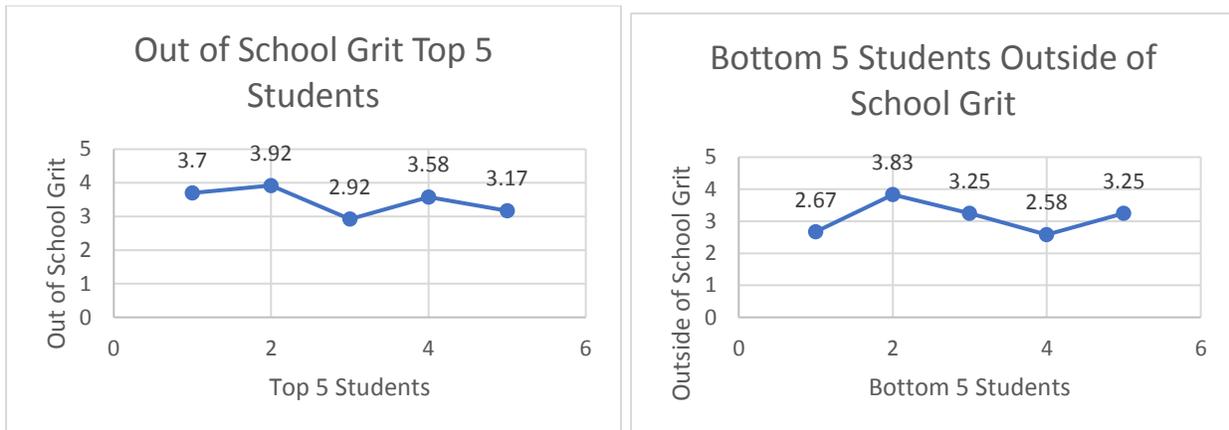
Table 4

Table 3 illustrates student outside of school Grit scores of the top 5 students and the bottom 5 students according to grade point average in order from highest grade point average to lowest grade point average. The first graph gives data on the top 5 performing students according to GPA. The second graph gives data on the bottom 5 students according to GPA. The average

outside of school Grit for the top 5 students was 3.458 out of 5. The average outside of school

Grit for the bottom 5 students was 3.116 out of 5.

According to the data about the top 5 students, the student with a GPA of 89.5% scored

3.7 out of 5. The student with a GPA of 88.67 scored 3.92 out of 5. The student with a GPA of

87% scored 2.92 out of 5. The student with a GPA of 86.67% scored 3.58 out of 5. The female

student with a GPA of 86% scored 3.17 out of 5. Of the 5 students, 2 of the student's outside of

school Grit decreased.

According to the data about the bottom 5 students, the student with a GPA of 72.17%

scored 2.67 out of 5 on the academic Grit Scale. The student with a GPA of 71% scored 3.83 out

of 5. The student with a GPA of 70% scored 3.25 out of 5. The student with a GPA of 68.8%

scored 2.58 out of 5. The student with a GPA of 61.8% scored 3.25 out of 5. Of the 5 bottom

performing students, 1 student's Grit decreased, two students' Grit scores increased, and two

students' Grit scores stayed the same. The Grit score that overlapped, and occurred the most

often between the two groups was 3.25 out of 5.

Conclusions

The averages of the Grit scores and GPAs show that there is a relationship between grade

point averages and student Grit. The out of school Grit, overall, was higher than the academic

Grit. In both scales given, the data shows the students with higher GPAs, on average, had higher

Grit. Both the highest and lowest performing students, on average, had higher Grit levels when

scaling themselves according to outside of school activities.

Although the average scores showed a relationship between Grit and academic GPA, of

the top 5 performing students, student 4 showed a lower academic Grit score of 2.83 out of 5

with a GPA of 86.67%. Student 5 had an academic Grit score of 3.25 out of 5 with a GPA of

86%. Of the bottom 5 students, 5/5 of the students scored a 3.25 or below on the academic Grit

scale. Only 1/5 students was failing. The failing student, Student 5, scored his academic Grit at

3.25 out of 5. Chapter 5 will discuss the implications that have emerged from this study. Chapter

5 will also discuss similarities and differences between this study and others, and it will discuss

inferences and conclusions about the results.

Chapter 5 Discussion

The previous chapter discussed the results of the research study that I conducted on the

connection between student grade points averages (GPAs) and Grit. The data was recorded for

each individual student, and the student groups averaged. The previous chapter included graphs

as visual aids, and discussion of numbers. This chapter will discuss the implications of the

findings for the study, inferences and conclusions about the results, comparison of research, and

limitations of the study.

Significance

The study described in Chapter 3 showed that there was a noticeable pattern when

looking at the overall averages of student grade point average and the two different Grit Scale

scores. The overall averages of the top 5 students and bottom 5 students showed the top 5

students have a higher level of Grit on both academic Grit and outside of school Grit than the

bottom 5 performing students. When student scores were read individually, they still showed the

same pattern, but some students had higher than expected Grit scores in comparison to their

GPA. Although the findings showed that there is a relationship between Grit and student GPA,

further research is needs to be conducted to give an answer about if the Grit Scale should be used

as a predictor of student success within a dual college high school program.

The students who were in the bottom 5 performing and attending a college class were failing the college class at the time of the study. It is difficult to say if this is in relationship to Grit because none of the top 5 performing students according to GPA were able to take a college course at the time of the study.

Comparison of Research

The overall Grit score in relation to student GPA results for the 10th grade students were similar to previous research from Strayhorn (2013), which included grit in relation to GPAs of black male college students at a predominately white institution. The results from both studies showed that there was a relationship between Grit and GPA. The researched information about Grit in relation to student GPA was limited. It is also important to note that the research found about Grit and student GPA scores was conducted using college age students. The studies that the researcher found did not include student Grit in comparison to GPA when looking at middle and high school aged students.

Limitations of the Study

It is important to state the limitations of the study. One of the limitations to be noted is that the PBL Academy is a brand-new program. Student entrance into the program for the students furthest along was not refined because there was unknown information about the criteria for student selection into the program.

Another notable limitation to the study is that there are various pathways the students can choose for their certifications in the manufacturing industry. These pathways could make a difference with student coursework and the timing of classes that must be taken. Some students are further ahead in their pathway because of previous coursework completed during their education.

There was a small selection of students included in the study, and there was only one 5 week marking period used to collect student GPA for the selection of participants in the study. The college courses were not factored into the program GPA for student selection for the study. There was also a small female to male ratio.

While administering the Grit Scale, the counselor noted that some of the students had difficulty understanding some of the wording. The wording was not explained to the students during the Grit Scale either time it was administered so that results would remain consistent.

There were many limitations to the study: student selection for the study, gender of students, the amount of time students had been in the program, and pathways. Although the selection for the study was small and specific, the results supported the hypothesis, showing there was a relationship between Grit and student GPA. It was interesting that the results showed that there was a relationship between inside and outside of school Grit. The results and limitations of the study show that further research is needed to solidify the hypothesis.

Future research

If given more time, future research would be completed to see if there is a continuing relationship between student GPA and Grit. If someone were to continue research, I would suggest administering the Grit scale to students every year from the time they are in 6th grade during every marking period to see the changes in Grit and GPA. It would be interesting to see if Grit scores change with GPA. Further research would be needed to find if student Grit changes from high school to college.

I would also suggest giving students the opportunity to ask questions about the Grit Scale, and would explain to the students what Grit is. I might even suggest scoring and administering the Grit Scale using a verbal interview process.

Since there are so few female students within this dual college high school program, I would suggest future research to examine only the female students' scores to see how they compare to males. It would be interesting to find out if female students had a higher Grit and GPA than male students in manufacturing programs.

The final suggestion I have for future studies is for researchers to look at many different programs that offer the same project based learning environment and degrees as the PBL Academy and compare them from the time before students enter the program to the time they leave. This would give researchers a clear idea about if the Grit Scale is an appropriate tool to add to the rubric for student entrance into such programs.

Conclusions

This study researched Grit and student GPA for the PBL Academy, a new dual college high school program, to find out if measuring Grit is an appropriate addition to the application for entrance into the program. The researcher wanted to find out whether there was a difference in Grit between the top 5 performing and bottom 5 performing 10th grade students, according to GPA. Although there are many limitations to this study, as listed above, the study overall yielded supporting results for relating Grit to student GPA. The comparison for research was minimal and the researcher was unable to locate information through other studies using Grit for high school students in comparison to GPA. The question about whether Grit can be used on a rubric for student entrance into the PBL Academy remains. There is more research that needs to be conducted over the course of years to find out if student Grit changes over time, Grit can be taught, and to find out if students Grit does change, is it higher or lower in a project based learning environment like the PBL Academy. Of course, educators want to find out what drives a

student to persevere, and Grit has the potential to open the door for educators to enhance and

increase student persistence and perseverance in the classroom.

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Appendix A

Name:_____   Date:_____

12-Item Grit Scale
Directions for taking the Grit Scale: Please respond to the following 12 items.
Be honest – there are no right or wrong answers!
Cirlce the number that most accurately describes you.

1. I have overcome setbacks to conquer an important challenge.

1	2	3	4	5
Not like me at all	Not much like me	Somewhat like me	Mostly like me	Very much like me

2. New ideas and projects sometimes distract me from previous ones.*

1	2	3	4	5
Not like me at all	Not much like me	Somewhat like me	Mostly like me	Very much like me

3. My interests change from year to year.*

1	2	3	4	5
Not like me at all	Not much like me	Somewhat like me	Mostly like me	Very much like me

4. Setbacks don't discourage me.

1	2	3	4	5
Not like me at all	Not much like me	Somewhat like me	Mostly like me	Very much like me

5. I have been obsessed with a certain idea or project for a short time
but later lost interest.*

1	2	3	4	5
Not like me at all	Not much like me	Somewhat like me	Mostly like me	Very much like me

6. I am a hard worker.

1	2	3	4	5
Not like me at all	Not much like me	Somewhat like me	Mostly like me	Very much like me

Appendix A Continued

7. I often set a goal but later choose to pursue a different one.*

1	2	3	4	5
Not like me at all	Not much like me	Somewhat like me	Mostly like me	Very much like me

8. I have difficulty maintaining my focus on projects that take more than a few months to complete.*

1	2	3	4	5
Not like me at all	Not much like me	Somewhat like me	Mostly like me	Very much like me

9. I finish whatever I begin.

1	2	3	4	5
Not like me at all	Not much like me	Somewhat like me	Mostly like me	Very much like me

10. I have achieved a goal that took years of work.

1	2	3	4	5
Not like me at all	Not much like me	Somewhat like me	Mostly like me	Very much like me

11. I become interested in new pursuits every few months.*

1	2	3	4	5
Not like me at all	Not much like me	Somewhat like me	Mostly like me	Very much like me

12. I am diligent.

1	2	3	4	5
Not like me at all	Not much like me	Somewhat like me	Mostly like me	Very much like me

Appendix B

"You are being given the Grit Scale to complete in order to find out the amount of passion and endurance you have to complete certain tasks. Please put your names at the top of the paper. You will be asked to complete this Grit Scale according to academic activities. For example, homework, tests, and projects completed in school. The Grit Scale should only be completed based on academics, nothing outside of school work. This activity is not graded, and will not affect your academic scores in this program. Only circle ONE number for each answer. When you are finished turn your papers over and I will collect them. I will read the directions at the top and when I am finished, you may begin"

"You are being given the Grit Scale to complete in order to find out the amount of passion and endurance you have to complete certain tasks. Please put your names at the top of the paper. You will be asked to complete this Grit Scale according to outside of school activities. For example, sports, or at home projects. The Grit Scale should only be completed based on outside of school activities, not according to school work. This activity is not graded, and will not affect your academic scores in this program. Only circle ONE number for each answer. When you are finished turn your papers over and I will collect them. I will read the directions at the top and when I am finished, you may begin"

Appendix C

FREDONIA
STATE UNIVERSITY OF NEW YORK

26 January 2017

Jordin Erickson
c/o Robert Dahlgren, Ph.D.
Curriculum and Instruction
College of Education
Thompson Hall
The State University of New York at Fredonia

Re: Jordin Erickson— Is the GRIT Scale an Appropriate Addition to a Potential
Rubric for Student Acceptance into a Rigorous Project Based Learning Early College
High School Program?

Your research project using human subjects has been determined Category 1,
Exempt, under the United States Department of Health and Human Services Code of
Federal Regulations Title 45 Public Welfare, Part 46 Protection of Human Subjects,
46.101, Subpart A (b) (1) and/or (2). This document is your approval and your
study titled "Is the GRIT Scale an Appropriate Addition to a Potential Rubric for Student
Acceptance into a Rigorous Project Based Learning Early College High School
Program?" may proceed as described, beginning on **February 1, 2017 and ending
on April 30, 2017.**

Thank you for keeping the high standards relating to research and the protection of
human subjects under the auspices of the State University of New York at Fredonia.

Sincerely,

Judith M. Horowitz, Ph.D.
Associate Provost, Graduate Studies, Sponsored Programs
  and Faculty Development
Human Subjects Administrator

Appendix D

Informed Consent

Protocol Title: Is the Grit Scale an appropriate addition to a potential rubric for student acceptance into a rigorous project based learning early college high school program?

Please read this consent document carefully before you decide to participate in this study. If this form is not returned or not signed, I will assume that permission for your son or daughter to participate in the study is granted. If the form is returned anytime during the study, signed, that signature will be honored according to your wishes indicated on the form.

Purpose of the research study:

To find out if students Grit score is related to their GPA.

What you will be asked to do in the study:

To complete the 12 point Grit Scale two times to determine student level of motivation and self-directed learning.

Time Required:

Time required to complete the Grit Scale is dependent on each participant. Grit Scales will be collected immediately after the participant indicates he or she is finished.

Compensation:

There is no compensation for participating in the study.

Confidentiality:

Your child's identity will be kept confidential to the extent provided by the law. Names of the children in the study will not be used. The children in the study will be given alias names which will help with confidentiality. All information will be kept in a safe and secure area.

Voluntary participation:

Your participation in this study is completely voluntary. There is no penalty for not participating.

Right to withdraw from the study:

You have the right to withdraw from the study at any time without consequence.

Potential Benefits and Risks:

This investigation will add to the research and knowledge of the teachers and administration about students Grit scores being an effective way of predicting student success within the program.

Whom to contact if you have questions about the study:

Jordin Erickson, Teaching Assistant

Email: Jerickson@e2ccb.org

Whom to contact about your rights as a research participant in the study:

Dr. Judith Horowitz

Associate Provost for Graduate Studies, Sponsored Research and Faculty Development

Maytum Hall 805

Judith.horowitz@fredonia.edu

(716) 673-4708

I have read the procedure outlined above. I voluntarily agree to participate in this study and have received a copy of this description.

_____   _____

Participant's signature   *Date*

_____   _____

Principal investigator's signatures   *Date*