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Grit and Student Performance: A Mixed-Method Analysis of a Non-Traditional Technical High School and a Traditional High School

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by

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Dr. John D. Long, Dissertation Chair	11.19.15 Date
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Declaration of Originality

I do hereby declare and attest to the fact that this is an original study based solely upon my own scholarly work here at Lindenwood University and that I have not submitted it for any other college or university course or degree here or elsewhere.

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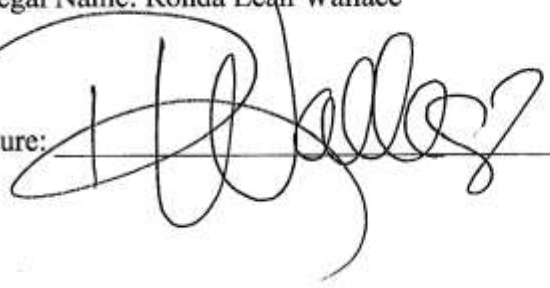
Signature:  Date: 11·19·15

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Abstract

Grit, defined as the tendency to pursue long-term goals with sustained zeal and hard work, was shown to predict achievement in academic, vocational, and avocational domains. In 2009, Duckworth and Quinn found that grit predicted student effectiveness in school and the concept of grit was largely unrelated to talent. Grit provided incremental predictive validity for achievement outcomes, particularly in settings of high challenge. From the combination of persistence, self-control, and more broadly, conscientiousness, emerges the concept of grit.

The purpose of this study was to compare the relative grittiness of students from two different high school settings. The first of these was a non-traditional technical high school. The second was a traditional suburban high school. One hundred students from each high schools took the Grit-S survey to determine their level of grit. It was found that students attending the non-traditional high school and students attending the traditional high school had no statistically different level of grit. However, students from the non-traditional technical high school had an observably higher level of self-reported grit. Teachers and administrators were interviewed to determine their perceptions about grit. Qualitative analysis of their responses rendered three commonalities. The first theme was a definition of grit rooted in persistence and self-motivation. The second theme was the need for adults to model grit for the benefit of their students. The third theme was a lack of difference between the genders in perceived grit or academic prospects.

This dissertation expanded on the research of Grit and Student Performance as it relates to students who attend a non-traditional technical high school and students who attend a traditional high school. There was a lack of previous research comparing these

two distinct types of high schools. After the data was gathered and analyzed no significant differences were found. This dissertation provides ideas for future research and its results may possibly change attitudes about students in both high school settings.

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Chapter One: Introduction

Robertson-Kraft and Duckworth (2014) defined grit as "perseverance and passion for long-term goals that predicted effectiveness largely unrelated to talent" (p. 1087). Despite a focus on preventing students from dropping out of high school, statistics in urban areas, where this study took place, remained stagnant. Research conducted by Rivkin, Hanushek, and Kain (2005), Rockoff (2004), and Sanders and Rivers (1996) found that many teachers were more effective than others and their effectiveness was important when considering in-school factors that affected student learning. According to a study conducted by Duckworth and Quinn (2009), grit may play an important role in influencing teacher performance as it relates to teaching. Throughout the years, there was a noticeable amount of research that concluded teacher effectiveness was the most important influential factor in schools when it came to student progress. Grit could be one reason why students either stayed in school despite situations placing them in the 'at risk' or 'drop out' category.

The researcher was interested in how well grit would predict the motivation and determination of students in two different high school environments, one, a traditional high school and the other, a non- traditional technical high school. The non-traditional technical high school offered various on campus certifications related to a trade. To gain a better understanding of grit and the success of high school students who attended a non-traditional technical high school and students who attended a traditional high school, there was a need for research comparing the two.

The researcher believed there was a possible difference in the level of grit among students who attended a non-traditional technical high school and students who attended

a traditional high school. Students who attended a non-traditional technical high school worked towards earning a certification in a specified area of interest, a goal driven learning environment where students "have an interest in and effort toward very long-term goals" (Duckworth, Peterson, Matthews, & Kelly, 2007, para.1). Students were still encouraged to attend a college or university; however, they had an opportunity to earn certification in their chosen field. In the researcher's experience and as an education administrator within both learning environments, the researcher hypothesized that a student who attended a non-traditional technical high school had a higher grit level, due to the focus on earning a career certification that could possibly earn the student a career salary immediately upon graduation.

Rationale

At the time of this writing, the researcher was unable to find studies that measured a difference between the level of grit in students who attended a traditional high school and a non-traditional technical high school. Only a few studies examined the role of grit and academic success between groups of students (Duckworth & Quinn 2009; Rojas, Reser, Usher, & Toland, 2012; Strayhorn, 2014). In all of these studies, students reported their perceptions using the validated Grit-S.

There were three areas focused around grit research: (a) the beginning of the development of the Grit-Scale, (b) clarification of its meaning and distance from other personality traits, and (c) assessments of its predictive validity assigned for specific samples (Duckworth et al., 2007). Examples would be from the 2009 research conducted by Duckworth and Quinn (2009), which analyzed data from US Military Academy cadets at West Point. In their research, Duckworth and Quinn (2009) concluded that grit

predicted completion of the academy's rigorous summer training program better than the measure used in the study, the Whole Candidate Index. The researchers concluded, "Grittier West Point cadets were less likely to drop out during their first summer of training" (Duckworth & Quinn, 2009, p. 173). There were similar conclusions made for National Spelling Bee participants (Duckworth, Kirby, Tsukayama, Berstein, & Ericsson, 2011) and public school students in fourth through eighth grades (Rojas et al., 2012). "Although ability and motivation have long been implicated in the predication of achievement, a greater amount of research has been focused on the benefits of ability for predicting achievement than motivation" (Duckworth & Seligman, 2005, p. 3).

The instruments used to measure grit were extensively studied. In 2007, Duckworth et al., acknowledged a two-factor arrangement for the original 12-item self-reported measure of grit (Grit-O). The arrangement was consistent with the theory of grit as a composite trait comprising stamina in dimensions of interest and effort (Duckworth & Quinn, 2009, p. 166). Further investigation validated a more efficient measure of grit, which retained items for the Short Grit-Scale (Grit-S), with the best global predictive validity across four samples originally presented by Duckworth et al. (2007). The Grit-S, utilized for the purpose of this study, was shorter in length and noted by Duckworth and Quinn (2009) to be statistically stronger than the 12-item Grit-Scale. The reduction of items from the Grit-O to the Grit-S did not affect predictive validity, so the shorter version of the instrument was recommended by the authors, Duckworth and Quinn (2009).

"Measures of grit provided incremental predictive validity for achievement outcomes, particularly in settings of high challenge" (Duckworth et al., 2007, p. 1087).

The researcher explored the possible difference in the level of grit between students who attended a non-traditional technical high school and students who attended a traditional high school. Research, current at the time of this writing, on technical high schools and traditional high schools focused on criteria such as grades, dropout rate, transcript credits, and attendance (Kazis, 2005). A prior study found that students who received a technical education were less motivated and more at risk of dropping out of high school (Kazis, 2005). Proponents of Career and Technical Education (CTE) viewed CTE programs as an important part of the high school environment and a valuable source of attachment of motivation and learning on the secondary level; this holds true for non-college-bound students (Arum, 1998; Castellano, Stringfield, Stone, & Wayman, 2003; Rosenbaum, 2001).

A 2003 report of the Advisory Committee for the National Assessment of Vocational Education suggested that combining academic courses with CTE courses was a powerful experience for students, keeping them attached to school and motivating them to complete their diplomas (as cited in Plank, DeLuca, & Estacion, 2008). A non-traditional technical high school featured different learning styles and interests because the programs had direct connections with academic skills in classrooms exhibiting real-life workplace activities (Saunders, Hamilton, Fanelli, Moya, & Cain, 2013). With regard to long-term goals and endurance, Duckworth and Quinn (2009) wrote, “Achievement is the product of talent and effort, the latter a function of the intensity, direction, and duration of one’s exertions towards a long term goal” (p. 1097). If the long-term goal was high school graduation, investigating grit in different secondary school environments

may provide insight to administrators and teachers who want to prevent students from dropping out.

Research Questions and Hypotheses

RQ1: How do secondary educators and principals in a traditional high school setting perceive grit among their students?

RQ2: How do secondary technical school educators and principals in a non-traditional high school setting perceive grit among their students?

H1: There will be a difference in the level of grit among students who attend a non-traditional technical school and students who attend a traditional high school, as measured by the Grit-S Survey.

H2: There will be a difference in the level of grit among male and female students that attend a non-traditional technical or traditional high school.

Brief Outline of Study Procedure

Duckworth et al. (2007) coined grit as an individual's motivation and tenacity to successfully accomplish a goal. For this study, students voluntarily participated in the Grit-S survey created by Duckworth and Quinn (2009) to measure a person's grit. The eight-item survey was a more efficient way to measure grit identified items for the Grit-S (Duckworth et al., 2007). The first task was to ensure that all students were given a parental consent form and or a consent form for participation, if they were 18 years-of-age or older.

The second task was to make sure that the forms were returned with the proper signatures in place. The distributed consent forms were given a two-week turn around to guarantee that time limits were met, with regard to completing the survey. Students were

asked to complete the eight-question survey via Survey Monkey, an electronic surveying program. Teachers and administrators were interviewed to get their viewpoints on grit as it pertained to student achievement within their schools. Answers varied depending on teacher and administrator responses from the Technical High School and the Traditional High School. Data compiled from the Grit-S Survey varied in answers according to which school the student attended.

All students who returned a consent form participated in the survey; however many students verbalized that they did not feel like participating on the day of the survey, and completed the survey on an alternate day, via Survey Monkey. On survey administration day, space was impacted at the Technology High School because of limited technology present in the computer labs. The survey responses varied amongst students, which is outlined in the results section of the dissertation, in Chapter Four.

Limitations

There were a few limitations on this research. First, the researcher relied on each student to answer questions on the Grit-Scale honestly. Though confidentiality was assured, some participants may have been more motivated than others to desire to look good (Duckworth et al., 2007). An additional concern was whether there was adequate technology to accommodate all participants. The then-current research was based on a sample of students who were predominantly Caucasian at the Traditional High School and predominantly African American at the Technical High School. In addition, grit was associated with educational attainment of which the scores would also reflect what Duckworth et al. (2007) described as “social desirability bias” (p. 1099).

Secondly, the Grit-Scale questioned participants on their characteristic approach to goals, setbacks, and challenges (e.g., setbacks, delays, and obstacles do not discourage me). The wording, even in the present tense could necessitate a reflection that one's past behavior predicts future behavior. A case could be made that the sum total of Duckworth's research was to show that past behavior predicts future behavior (Duckworth et al., 2007). The strong version of this complaint would suggest that there was no stable individual difference called grit (Duckworth et al., 2007). Rather, there was consistency of behavior across time, possibly reflecting consistency of situation (Mischel, 1989).

Other limitations included a difference in each district's staffing. School District A (Technical High School) had 521 certified high school staff with an average salary of $63,760 with 14.7 years of experience (Missouri Department of Elementary and Secondary Education [MODESE], 2015, p. 1). School District A had 49.3% of their high school teachers with masters degrees or higher. School District B (Traditional High School) had 167 certified high school staff within its one high school. The average salary of high school teachers in District B was $72,857 with 15.3 years of experience (MODESE, 2015, p. 1). School District B had 90.8% of its high school teachers with masters degrees or higher. Both the Technical High School and the Traditional High School had a greater female student population than male population. The Traditional High School had a 16 to 1 student-to-teacher ratio, whereas the Technical High School had a 38 to 1 student-to-teacher ratio (MODESE, 2015). The demographics from each school varied in race and gender. The Traditional High School had a total enrollment of 1, 823 with 2% Asian population, 18% Black population, 2% Hispanic population, and

75% White population. The free and reduced lunch rate at the Traditional High School was 14.9% at the time of this study (MODESE, 2015). The Technical High School had a total population of 1,048 students with .30% Asian population, 83% Black population, .30% Hispanic population, and 15% White population. The free and reduced lunch rate at the Technical High School was 70% at the time of this study (MODESE, 2015). Technology did not pose issues for the Traditional High School as all students were provided with i-pads. At the Technical High School, computers were not as readily available. Students participated in the Grit-S Survey via two computer labs that housed approximately 20 computers per lab, which made it difficult to have more than forty students participate in the Grit-Survey at a time. This made the process of student participation longer. Though the demographics varied between each school, it was not a variable used in this study.

Definition of Terms

Academic Perseverance - A critical factor for students' long-term educational attainment and was often the explicit goal of the growing focus on non-cognitive factors (Farrington et al., 2012).

Character – Something innate and unchanging, a core of attributes that define one's very essence. Skills that you can learn; skills you can practice, and skills one can teach (Seligman & Peterson, 2004).

Conscientiousness - Closely associated with grit depending on whether one was achievement oriented or dependable (Duckworth et al., 2007).

Effective Teacher - One who had the necessary certification, content area knowledge, and strong verbal and cognitive abilities (Goodwin, 2010).

Excellence - For the purpose of this study: was an attitude that reflects success.

Grit - Perseverance and passion for long-term goals (Duckworth et al., 2007).

Non-Traditional Technical High School - For the purpose of this study, a non-traditional high school was defined as a high school designed to train students about specific career opportunities available to them; a curriculum not offered by a traditional high school.

Passion - A strong inclination toward an activity that people liked, found important, and in which they invested time and energy (Vallerand, Pelletier, & Koestner, 2008).

Perseverance - the ability to stay focused on a goal despite obstacles, foregoing distractions or temptations. (Farrington et al., 2012).

Traditional High School - For the purpose of this study a traditional high school was state accredited for grades nine through 12 and followed the guidelines set forth by the Missouri Department of Elementary and Secondary Education (MODESE, 2015).

Summary

Duckworth studied grit and its ability to predict whether a person would be successful in settings of high challenge, such as schools. This research looked at two different secondary school settings: The first was a non-traditional technical high school, and the second was a suburban traditional high school. Students from each setting were surveyed to look for differences on the Grit-S. Chapter Two looks at the history of Grit research, as well as non-traditional and traditional high schools.

Chapter Two: Literature Review

Introduction

In this chapter the history of grit research, including the work of Angela Duckworth will be examined. Multiple characteristics combine to make what was known as grit. Later in the chapter, a brief historical overview of vocational education will be presented to provide a comparison with traditional high school education. The examination of the intersection of grit with these two settings was the focus of this research effort.

Definition of Grit

Grit was defined as the tendency to pursue long-term goals with great zeal and hard work and was shown to predict achievement in academic, vocational, and avocational domains (Duckworth et al., 2007; Duckworth & Quinn, 2009; Duckworth, Quinn, & Seligman, 2009). In 2009, Duckworth and Quinn found that "Grit provided incremental predictive validity for achievement outcomes" (2009, p. 7), particularly in settings of high challenge (Duckworth et al., 2007).

The combination of persistence, self-control, and more broadly conscientious, emerges the concept of grit (Duckworth et al., 2007; Duckworth & Quinn, 2009). "Grit entails working strenuously toward challenges, maintaining effort and interest over years despite failure, adversity, and plateaus in progress" (Duckworth et al., 2007, p. 1088). "Grit overlaps with achievement aspects of conscientiousness but differs in its emphasis on long-term stamina rather than short-term intensity" (Duckworth et al., 2007, p. 1089).

Grit required a cognitive decision to pursue a long-term destination rather than an incessant subconscious drive for achievement (Duckworth et al, 2007; McClelland,

Koestner, & Weinberger, 1989) and grit showed to be predictive of several aspects of success beginning with retention in a study completed at the West Point Cadet training program. Duckworth and Quinn (2009) analyzed data from 1,248 U.S. Military Academy cadets at West Point. The researchers found that grit predicted completion of the academy's rigorous summer training program better than the Whole Candidate Index, comprised of one's weighted high school rank, SAT score, involvement, any physical exercise evaluation, which was used for admission (Duckworth & Quinn, 2009, pp. 1094-1095). Duckworth and Quinn (2009) concluded that grittier West Point cadets were less likely to drop out during their first summer of training (p. 173). Duckworth et al. (2011) found similar conclusions for the National Spelling Bee participants and public school students in grades 4 through 8 (as cited in Rojas et al., 2012).

Duckworth, found higher grade point averages amongst undergraduates, higher education attainment among adults, and further progress in the Scripps Spelling Bee (Duckworth et al., 2007; Duckworth & Quinn, 2009). Duckworth et al. (2011) found in their longitudinal study on children attending the National Spelling Bee, that highly gritty children dedicated themselves assiduously to deliberate practice, an activity which entailed working where challenges exceeded skill levels, and involved working hard at less enjoyable tasks. "Although ability and motivation have long been implicated in the predication of achievement, a greater amount of research has been focused on the benefits of ability for predicting achievement than motivation" (Duckworth & Seligman, 2005, p. 3). Grit, in contrast, can entail dedication to either implicitly or explicitly rewarding goals (Duckworth et al., 2007, p. 1089). Duckworth predicted that children with talent have fewer opportunities to develop a resistant approach to setbacks and failures compared

with highly gritty children due to their less frequent encounter with negative outcome (Duckworth & Eskreis-Winkler, 2013).

"Grit comprised a suite of traits and behaviors, including goal-directedness (knowing where to go and how to get there), motivation (having a strong will to achieve identified goals), self-control (avoiding distractions and focusing on the task at-hand), positive mind-set (embracing challenge and viewing failure as a learning opportunity)" (Goodwin & Miller, 2013, p. 74). Each of these qualities influenced student success; however, they were still teasing out how the combination of these qualities created a whole that was greater than the sum of its parts (Goodwin & Miller, 2013). Duckworth, Peterson, Matthews, and Kelly (2007) argued that grit entailed working very hard towards challenges [and] maintaining effort and interest over years despite failure, adversity, and plateaus in progress.

"The gritty individual approaches achievement as a marathon; his or her advantage is stamina" (Duckworth et al., 2007, p. 1088). According to Duckworth et al. (2007), disappointment or boredom signals to others that it was time to change trajectory and cut losses, the gritty individual stays the course (pp. 1087-1088). Grit was the combination of the self-control aspects of conscientiousness coupled with a long-term and narrowed focus on achieving intrinsic or extrinsic goals (Duckworth et al., 2007). The personality of grit, defined as the tendency to pursue long-term goals with sustained zeal and hard work was shown to predict achievement in academic, vocational, and avocational domains (Duckworth et al., 2007; Duckworth & Quinn, 2009; Duckworth et al., 2009). Goldberg (1990) related grit to the notion of conscientiousness. Conscientious

individuals were thorough, careful, reliable, organized, industrious, and self-controlled (Duckworth et al., 2007).

Grit required a cognitive decision to pursue a long-term destination rather than an incessant subconscious drive for achievement (Duckworth et al., 2007; McClelland et al., 1989). According to Duckworth et al. (2007), grit was the combination of the self-control aspects of conscientiousness coupled with a long-term and narrowed focus on achieving intrinsic or extrinsic goals. Grit differed from achievement measures in that grit did not require short feedback loops to complete attainment goals (Cross, 2014). The gritty individual persisted even when feedback loops were spread out over months or years (Duckworth & Quinn, 2009).

Locke and Latham (2006) stated that 25 years of research revealed that creating challenging goals for students encouraged greater effort and persistence than providing moderate, "do-your-best" goals or no goals at all. Doskoch (2005) science writer and former executive editor of *Psychology Today*, said grit was in the same category as self-motivation and self-discipline. The simplicity of setting a high bar was inadequate (Doskoch, 2005).

Students also needed the will to achieve goals (Poropat, 2009); a growth mind-set, or the belief that they can become smarter and turn failure into success through their own efforts (Dweck, 2007); and the ability to delay gratification and stay focused on the task at hand-what psychologist call self-regulation (Goodwin & Miller, 2013). Dweck (2007) believed there were two principal modes of thinking: fixed mind-sets and growth mind-sets. Fixed mind-sets kept an individual's intelligence static, kept them from avoiding mistakes, and prioritized looking smart over learning (Dweck, 2007).

Because people with fixed mind-sets sought situations, in which success was practically guaranteed; they were unlikely to develop grit (Dweck, 2007). Dweck (2007) believed that those with growth mind-sets stemmed from knowing that the harder they worked and the longer they tried the likelier they were to succeed. Grit was different from the need for achievement, described by McClelland (1961) as a drive to complete manageable goals that allowed for immediate feedback on performance (as cited in Duckworth et al., 2007, p. 1089). Duckworth et al. (2007) concluded that individuals with great need for achievement pursued goals that were neither too easy nor too challenging; individuals high in grit set deliberate and extremely long-term objectives for themselves and did not veer from them, even in the absence of positive feedback (p. 1089)

According to Duckworth's findings, there were five characteristics of grit. Courage was directly proportional to an individual's level of grit (Perlis, 2013). For example, refusing to conform to another person's actions or attitude. Conscientiousness was closely associated with grit depending on whether you were achievement oriented or dependable (Duckworth et al., 2007). An example would be being conscientious for turning in an assignment on time. "Grit is distinct from dependability aspects of conscientiousness, including self-control, in its specifications of consistent goals and interests" (Duckworth et al., 2007, p. 1089). Perlis (2013) reported the achievement-oriented individual was one who worked tirelessly while having attempted to do a good job and complete a task, whereas the dependable person was more notably self-controlled and conventional. With regard to long-term goals and endurance, Duckworth wrote, "Achievement is the product of talent and effort, the latter a function of the intensity, direction, and duration of one's exertions towards a long term goal" (as cited in

Blanchette, 2014, para. 14). Zolli and Healy (2012) described resilience as the ability of people, communities, and systems to maintain their core purpose and integrity among unforeseen shocks and surprises. Resilience was a multidimensional construct (Cicchetti, 2013), and it was the ability to pass the hardest problems and overcome the most complex situations (Jackson, 2008). Resilience allowed people to overcome their pitfalls and overcome the complex situation (Issacson, 2002).

Excellence was an attitude and perfection was someone else's perception of an ideal (Perlis, 2013). While the aforementioned characteristics were a part of Duckworth's findings, Maddi (2006) wrote that the combinations of attitudes provided the courage and motivation to do hard, strategic work. While grit was a measure of an individual's ability to persist in obtaining a specific goal over an extended period of time (Duckworth et al., 2007), resilience was a process in which an individual overcame significant adversity (Maddi, 2006). Grit overlapped with achievement aspects of conscientiousness but differed in its emphasis on long-term stamina rather than short-term intensity (Duckworth et al., 2007, p. 1089). Grit required a cognitive decision to pursue a long-term destination rather than an incessant subconscious drive for achievement (Duckworth et al., 2007; McClelland et al., 1989).

Characteristics of Grit

Conscientiousness. Conscientious was a spectrum of constructs that described individual differences in the propensity to be self-controlled, responsible to others, hardworking, orderly, and rule abiding (Roberts, Jackson, Fayard, Edmonds, & Meints, 2009). John, Nauman, and Soto (2008) described conscientiousness as "Socially prescribed impulse control that facilitates task and goal-related behavior" (p. 120).

Conscientiousness included a number of lower level traits and facets, such as self-control and perseverance (Roberts, Chernyshenko, Starks, & Goldberg, 2005). "Conscientiousness emerged as the personality trait most consistently and strongly related to academic success" (Poropat, 2009, p. 30). Grit was said to be distinguished from conscientiousness, a multi-dimensional family of personality traits that encompasses perseverance but also includes tendencies toward responsibility, self-control, orderliness, and traditionalism (Roberts et al., 2005). Grit provided incremental predictive validity for achievement outcomes while correlated with conscientiousness, particularly in settings of high challenges (Robertson-Kraft & Duckworth, 2014).

Courage. Pury and Starkey (2010) described courage as something necessary for psychotherapy patients to use to help them understand how they interacted with the world. Durlak, Mahoney, Bohnert, and Parente (2010) stated that psychotherapy was clearly not part of general factors, but there were some commonalities between fields, such as the ability to learn, grow and adjust to an ever-changing world. Courage was typically seen as an abstract concept, but others have demonstrated and reported that courage can actually be seen and felt. Courage reflects perseverance in the face of difficulty that also encompasses possible apprehension, fear, anxiety, and uncertainty (Martin, 2006). Martin (2006) wrote that Aristotle said that courage was acting appropriately in situations involving challenge and fear. Woodard (2004) saw courage as meaningful actions despite fear. Courage was historically regarded as a great virtue because it helped people face their intrapersonal and interpersonal challenges (Lopez, Koetting, O'Byrne, & Petersen, 2003).

During the philosophical ages, philosophers coined two types of courage: physical courage and moral courage. Physical courage, identified as the ability to overcome the overwhelming fear of harm or death exceeded moral courage, which was discussed in terms of the expression of authenticity in the face of dissention (Larsen & Giles, 1976). Pittman (1997) acknowledged courage as stemming from a psychological processes; he also stated that courage focused on the strength to confront destructive habits and irrational anxiety (as cited in Lopez et al., 2003). Psychological courage may be the claim of what we refer to as the vigorous courage displayed daily in people's perseverance (Lopez et al., 2003).

According to van den Brink and Benschop (2011), it was important to acknowledge that the standard of "excellence" was often difficult, or even impossible to achieve (p. 513). Excellence appeared to be synonymous with the highest achievement on the scale of academic quality, or the highest level of academic performance (Deem, 2009). Scully (1997) stated that the standards of excellence were based on the Western norms of meritocracy, which referred to a social system that sorted people into positions and distributed rewards to individuals solely according to performance or talent. "Academic excellence is within the specific context of the discipline and within the boundaries of the objectives of the institution or department in question" (Deem, 2009; Musselin, 2002, p. 513).

Academic Resilience. Defined as the ability to succeed in school despite adverse conditions, includes mechanisms such as confidence, a sense of well-being, motivation, an ability to set goals, relationship connections, and stress management (De Baca, 2010). Scales, Benson, Roehlkepartain, Sesma, A., and van Dulmen (2006) found that higher

levels of resiliency traits correlated with higher grade point averages. Grit was related to resilience because part of what it meant to be gritty was to be resilient in the face of adversity (Duckworth & Perkins-Gough, 2013). In 1998, Solberg et al. (1998) identified six key skills as the foundations of educational resiliency. The six identified key skills were building confidence, making connections, setting goals, managing stress, increasing well-being, and understanding motivation.

Passion and Perseverance. Duckworth et al. (2007) stated that perseverance could foster passion. Chinh Chu believed perseverance was purely a state of mind that depended on one's happiness and level of discomfort (as cited in Doskoch, 2005). Persistent individuals were usually passionate about their work; however that does not mean that passion comes first (Doskoch, 2005). In his article in *Psychology Today* Doskoch (2005), stated that passion may be the linchpin of grit, but it was not the only element.

Academic perseverance referred to a student's tendency to complete school assignments in a timely manner, to the best of the individual's ability, notwithstanding distractions, obstacles, or level of challenge (Farrington et al., 2012). According to Farrington et al. (2012) to persevere academically required that students stay focused on a goal despite obstacles (grit or persistence) and relinquish distractions or attractions to prioritize higher pursuits over lower pleasures. Academic perseverance was the difference between doing the minimal amount of work to pass a class and putting forth the effort in planning for long hours to truly master course material and excel in one's studies (Farrington et al., 2012). It required not only the initial outpouring of energy in a focused direction but also the ability to maintain that momentum regardless of what gets

in the way (Farrington et al., 2012). Nagaoka et al. (2013) cited the Farrington et al. research when they stated:

> Farrington found that there was strong evidence that factors such as a student's academic mindset (which encourage or inhibit continuing effort), their academic skills (which makes it easier or harder to complete a task), whether they have learning strategies (which make their efforts effective), and their innate personality are associated with academic perseverance. (p. 48)

A summary of findings by Duckworth and Quinn (2009) indicated that "Perseverance of Effort was a superior predictor of grade point average (GPA), extracurricular activities and television watching among adolescents" (p. 172). Farrington et al. (2012) concluded that there was a direct association with a student's mindset and perseverance and grades. The two developmental influences determined student engagement, class attendance, assignment completion, learning from failure, and sticking to tasks until completed (Farrington et al., 2012). According to Farrington et al. (2012), students who exhibited a growth mindset and grit earned better grades than students who did not. There was a great deal of evidence that students' persistence at tasks and the degree to which they exhibited self-discipline changes over time in different situations (Farrington et al., 2012). Academic perseverance was correlated to achievement (Duckworth et al., 2009; Farrington et al., 2012).

Gender Academic Differences. There was a disparity between males and females in the realm of educational achievement in this country for over two decades. The assumption was that academic performance and school completion was related to how that student felt about themselves. Gender was a very projecting, yet personal

characteristic, with a self-concept referring to one's biological sex developing as early as two to three-years-old (Fagot & Leinbach, 1985). An explanation by Fergusson, Lloyd, and Horwood (1991) suggested that gender differences in educational achievement was that these may ascend from gender differences in classroom behavior with the higher degrees of disruptive, inattentive behavior in boys which impaired male learning, leading to lower rates of academic accomplishment for boys.

Gender differences in the edifice of interests were well documented in personality measures (Lippa, 1998) and were found in personality measures. Kanfer and Heggestad (1997) found that these personality and interest differences may help account for gender differences in test performance. A minority of female students presented disruptive classroom behaviors and were at risk of educational under-achievement (Anderson, Williams, McGee, & Silva, 1987; Cohen, Velez, Kohn, Schwab-Stone, & Johnson, 1987; Fergusson, Horwood, & Lynskey, 1993). The pattern of gender differences were problematic because of the fact that female performance in high school and college courses was often under-predicted by regression equations computed across genders (Ackerman, Bowen, Beier, & Kanfer, 2001). Research completed by Dwyer and Johnson (1997), had shown that girls and women tended to achieve higher course rankings in high school and beyond in comparison to boys and men. A study conducted by Saunders, Davis, Williams, and Williams (2004), stated that males were much more habitually behind in school for their age, typically had lower grades in reading and conduct and were more likely to have failed one or more grades. It was also stated that women were underrepresented in science and technology education (Riegle-Crumb & King, 2010), and this underrepresentation broadened the gap between the ones that have and the have-nots

and confined the breadth and quality of human resources available in sciences (Muller, Stage, & Kinzie, 2001). It was conjectured that differences in patterns of courses at the high school level were at least partially responsible for gender differences on achievement test scores, exclusively in the math and science domains (Ekstrom, Goertz, & Rock, 1988).

Hu and Kuh (2002) concluded in their study that men were more likely to be either disengaged or highly engaged in constructive educational activities while women were more likely to fall in between these extremes into a more typical group (p. 119). According to Tett and Guterman (2000), female students had a tendency to accentuate family while their male equivalents tended to emphasize the job market when discussing motivations for college. Gender differences seemed to exist in students' ethical standards (Whitley, Nelson, & Jones, 1999), levels of academic engagement (Hu & Kuh, 2002), kinds of peer groups (Holland & Eisenhart, 1990; Hu, Kuh, & Vesper, 2002), and motivations for academic endeavor (Tett, 2002), with no significant differences in academic achievement (Chee, Pino, & Smith, 2005). Relative to males, females were less confident of their mathematics and science related capabilities (Kessels & Hannover, 2008). They indicated weaker mathematics and technology related self-efficacy, but stronger language related self-efficacy (Huang, 2013). They also displayed weaker interests in mathematics and science (Eccles, 2011). Females were more likely to experience anxiety, and were less likely to report joy in learning with respect to mathematics (Frenzel, Pekrun, & Goetz, 2007).

Males reported more positive attitudes than females towards science, technology, engineering, and mathematics (STEM) subjects (Kessels, Heyder, Latsch, & Hannover,

2014). Studies by varies researchers demonstrated that boys validated that they were less engaged and interested at school, found the coursework less enjoyable and not as meaningful and spent minimal time on homework compared with girls (Driessen & van Langen, 2013; Hannover & Kessels, 2011; Lam et al., 2012). Gender was a telling personal characteristic, with self-concept referring to an individual's biological sex developing as early as two to three-years-old (Fagot & Leinbach, 1985). Gender preferences or gender differences in academic engagement should become more likely when image or the prototype of a school subject were more strongly associated with one gender rather than the other (Kessels et al., 2014).

Big Five Characteristics of Grit

Duckworth et al. (2007) projected that grit was divergent from traditionally measured facets of Big Five conscientiousness in its emphasis on stamina (p. 166). The Big Five were broad factors of personality traits, which included Agreeableness, Conscientiousness, Extraversion, Neuroticism, and Openness to experience (Srivastava, 2013). The Big Five were collectively a taxonomy of personality traits that were a coordinated system that mapped which traits went together in people's descriptions or rating of one another (Srivastava, 2013). Research study results of the Big Five traits showed a positive correlation between the traits of conscientiousness and academic standards. With few exemptions, there were no significant correlations between openness, neuroticism, agreeableness, and extraversion (Busato, Prins, Elshout, & Hamaker, 2000; Chamorro-Premuzic & Furnham, 2005; Wolfe & Johnson, 1995). Inclusion of all Big Five traits was of great importance because they occurred together in individuals, they were inter-correlated, and have shown various patterns of validity when

calculated together than when correlated individually (Chamorro-Premuzic & Furnham, 2005). According to Zhang (2002),

> Neuroticism (N) is the opposite of emotional ability. People high on the N scale tend to experience such negative feelings as emotional instability, embarrassment, quilt, pessimism, and low self-esteem. People scoring high on the Extraversion (E) scale tend to be sociable and assertive, and they prefer to work with other people. Openness to experience (O) is characterized by such attributes as open-mindedness, active imagination, preference for variety, and independence of judgment. People high on the Agreeableness (A) scale tend to be tolerant, trusting, accepting and they value and respect other people's beliefs and conventions. People high on the Conscientiousness (C) scale tend to distinguish themselves for their trustworthiness and their sense of purposefulness and of responsibility. They tend to be strong-willed, task-focused, and achievement-oriented. (p. 1179)

In the line with the hypotheses of Paunonen and Ashton (2001), grit, a narrow facet of conscientiousness, has demonstrated incremental predictive validity over and above Big Five conscientiousness for achievement outcomes (Duckworth et al., 2007, p. 1088).

Agreeableness. Agreeableness had an interpersonal component (Pervin, 1999). Agreeable individuals tended to possess conformity in groups, modesty, the characteristic of not being demanding, and being sympathetic. These individuals might be motivated in the direction of helping others and on the way to pro-social behavior in general. There may be an association between the motivational progressions operating within individuals in concerns to this trait, such that agreeable individuals make every effort for intimacy

and solidarity in groups in which they belonged to, which provided emotional rewards. Agreeableness-like aspects seemed to be ubiquitous in social perception and cognition, the reason may be because it was linked to social evaluation (Graziano & Eisenberg, 1997). Agreeableness-like dimension has special theoretical status in many different accounts of social behavior and personality structure (Graziano, Jensen-Campbell, & Hair, 1996). In comparison with the other four dimensions, the Agreeableness dimension was possibly the most concerned with inter-personal relationships (Graziano et al., 1996). Ahadi and Rothbart (1994) suggested that Agreeableness might emerge developmentally from processes associated with "effort control." Individuals known as Agreeable were better able to control anger and negative affect in situations involving frustration (Graziano, 1994). "Whatever temperaments and developmental processes are involved in emotional self-regulation, their influence on adult individual differences almost certainly occurs through interaction with the caregiving and peer social environments" (Calkins, 1994, pp. 62-70). In the trait of Agreeableness, there may be some correlation personality and a set of cognitive or behavioral adaptations to social environment (Buss, 1995; Graziano & Waschull, 1994). In other words, students should be able to make correlations between their behavior and be able to adapt socially in any school environment.

Conscientiousness. Conscientiousness individuals were characteristically thorough, careful, reliable, organized, industrious, self-controlled (Duckworth et al., 2007). Being conscientious meant that one was purposeful, strong willed, responsible, and trustworthy (Zhang & Huang, 2001). Zhang and Huang (2001) stated that

> If one is conscientious about something, he or she may try different means to achieve his/her goals, incusing by being creative (legislative style), focusing on one thing at a time (monarchic style), analyzing the information at hand (judicial style), working on one's own (internal style) and so forth. (p. 469)

A conscientious individual would prioritize their work first and then use other thinking styles to work towards his or her goal (Zhang & Huang, 2001). Conscientiousness was more associated with academic performance (Blickle, 1996; Busato et al., 2000; Costa & McCrae, 1992). Studies performed by Wolfe and Johnson (1995) have duplicated this association in school as well as undergraduate (Chamorro-Premuzic & Furnham, 2005; Goff & Ackerman, 1992) and post-graduate (Hirschberg & Itkin, 1978) education. Conscientiousness appeared to be a consistent predictor of occupational performance in a variety of settings (Barrick, Mount, & Strauss, 1993). This meant that one's conscientious mind could appear in work related activities and interpreted differently throughout their work performance in many settings.

Conscientiousness was also linked to "strength of character" (Smith, 1969), motivation (Anderson & Keith, 1997; Boekaerts, 1996; Pelechano, 1972), and several performance-related traits that were directly assessed by the scale, such as achievement striving, dutifulness, order, and responsibility (Chamorro-Premuzic & Furnham, 2005; DeRaad & Schouwenburg, 1996).

According to Barrick et al. (1993), and Sackett, Gruys, and Ellingson (1998), conscientiousness was closely related to motivation which was the predictor of performance, particularly when extrinsic determinants of motivation were held constant. Furnham, Chamorro-Premuzic, & Moutafi, (2005) suggested some individuals created or

increased their conscientiousness in competitive academic settings to compensate for their relatively lower intelligence.

Conscientiousness and grit was an ability that was a component of emotional intelligence (Mayer & Salovey, 1997). Conscientiousness described an individual's maximum capacity to evaluate emotion regulation strategies that influenced one's affective experience and actions in ways that promoted goal attainment in emotionally charged situations (e.g. presence of competing goals, experience of challenges or obstacles) (Ivcevic & Brackett, 2014). When predicting academic accomplishment, several studies have found the success striving feature of conscientiousness to be especially highly correlated with academic achievement than the comprehensive trait of conscientiousness (Chamorro-Premuzic & Furnham, 2005; Paunonen & Ashton, 2001).

Extraversion. Extraversion was distinguished by adventurous, affiliation, positive affectivity, energy, ascendance, and ambition. Individuals who scored high on extraversion were predisposed toward positive affect and preferred interpersonal interaction (Mooradian & Swan, 2006). Extraversion was found to be positively related to positive emotions according to many studies (Costa & McCrae, 1980; Watson & Clark, 1992, p. 17). Costa and McCrae (1992) characterized individuals who exhibited extraversion as gregarious, assertive, warm, positive, and active as well as individuals that sought excitement (Matzler, Renzl, Mooradian, von Krogh, & Mueller, 2005).

Despite the complexity of the interaction of Extraversion with age, gender, and assessment methods, it was generally accepted that introverts may have had an advantage over extraverts with regard to their ability to consolidate learning, as well as lower distractibility and better study habits (Entwistle & Entwistle, 1970; Eysenck & Cookson,

1969; Sanchez-Marin, Rejano-Infante, & Rodriguez-Troyano, 2001). Rolfhus and Ackerman (1999) reported negative correlations between Extraversion and several knowledge tests. The researchers suggested that these correlations may be a consequence of differences in knowledge acquisition time between introverts (spend more time studying) and extraverts (spend more time socializing).

Neuroticism. According to Zhang and Sternberg (2005), neuroticism (N) was the opposite of emotional stability. People high on the N scale tended to experience such negative feelings as emotional instability, embarrassment, guilt, pessimism, and low self - esteem. "Neuroticism refers to the degree of emotional stability, impulse control, and anxiety" (Komarraju, Karau, Schmeck, & Avdic, 2011, p. 472). According to Chamorro-Premuzic and Furnham (2005), neuroticism or emotional instability was negatively associated with academic achievement. The relationship between academic performance and neuroticism was mainly explained in terms of anxiety, particularly under stressful conditions such as university exams (Hembree, 1988; Seipp, 1991). Zeider and Matthews (2000) have noted that neuroticism may also impair performance on psychometric intelligence drops from r=.35 under neutral conditions to r=.21 under stressful conditions. "Neuroticism may be associated not only with impaired examination performance, but also with lower levels of attendance and even negative physical consequences such as racing heart, perspiration, gastric disturbances, and muscle tension" (Matthews, Davies, Westerman, & Stammers, 2000, p. 454).

Neurotic students were more likely to be absent for examinations due to medical illness or to request and require "special treatment" (Chamorro-Premuzic & Furnham, 2005). It was shown that neuroticism was related to poor self-concept (Well & Matthews,

1994) and low self-estimated intelligence (Furnham et al., 2005). Lazarus and Folkman (1984) reported that since experiencing of stressful situations was, to a great extent, dependent on an individual's perception and appraisal of his/her capabilities to cope with that situation, it was likely that low self-concept and self-estimated intelligence may partly determine the increase of anxiety in neurotic individuals. Eysenck and Eysenck (1985) have suggested that the motivational effects of anxiety may be greater in extremely intelligent students because they encounter little challenges in their studying. Neuroticism was a positive predictor in intelligent students; however a negative predictor in less brilliant students (Chamorroe-Premuzic & Furnham, 2005).

Openness to experience. Openness to experience was categorized as intellect, which was related to active imagination, aesthetic sensitivity, attention to inner feelings, preference for variety, intellectual curiosity, and independence of judgment (Costa & McCrae, 1992). Individuals with high scores on openness were interested about both inner and outer worlds, and were willing to entertain innovative ideas and exceptional values, and they experienced both positive and negative sentiments more profoundly than do closed individuals (Costa & McCrae, 1992). People, who were highly open, displayed intellectual curiosity, creativity, flexible thinking, and culture (Dingman, 1990). The facets of openness were related to fantasy, aesthetics, feelings, actions, ideas, and values (Matzler et al., 2005).

Openness was reflected in a strong intellectual curiosity and a preference for novelty and variety (Komarraju et al., 2011). Openness was a known indication for individual differences and intellectual curiosity, need for cognition, and cognitive ability (Chamorro-Premuzic & Furham, 2005). Openness was understood as a major

"investment trait," meaning that it was causally and positively interrelated to knowledge and skill acquisition (Furnham, Christopher, Garwood, & Martin, 2007).

Consequently, open students were expected to be intrinsically motivated in their studies, show advanced levels of engagement with the subject they studied and enjoy their learning experience more (Chamorro-Premuzic & Furnham, 2005). In principle, high openness meant a "hungry mind," which was why open students were as likely to elect for a deep approach to learning, as they were to reject a surface learning approach (Chamorro-Premuzic & Furnham, 2005).

The Grit-Scale

Duckworth and her colleagues developed a 12-item self -report questionnaire known as the Grit-Scale to measure what they saw as the two distinct dimensions of grit; consistency of interests and persistent effort (Duckworth et al., 2007). Duckworth et al. (2007) identified a two-factor structure for the original 12-item self-report measure of grit (Grit-O). The Grit-S was designed by selecting items that Duckworth et al. (2007) considered predictively valid and replicated the two-factor structure of the Grit-O across four different samples of children and adults (Duckworth & Quinn, 2009).

While the 12-Item grit survey proved valid and reliable, the researchers determined that they could improve upon and shorten the instrument (Duckworth & Quinn, 2009). Duckworth and Quinn (2009) revised the 12-item survey to an eight-item survey by conducting another set of factor analysis and removed four items leaving eight (Cross, 2014). The researchers concluded that the eight-item survey (Grit-S) was a more efficient "and psycho-metrically stronger than the 12-item Grit O" (p. 175). The Short Grit-Scale (Duckworth & Quinn, 2009), utilized for the purpose of this study, while

shorter in length was noted by Duckworth and Quinn (2009) to be psychologically stronger than the 12-item Grit-Scale. The Grit-S was developed as a more efficient measure of trait-level perseverance and passion for long-term goals (Duckworth & Quinn, 2009). The Short Grit-Scale (Grit-S) (Duckworth & Quinn, 2009) comprised of eight items endorsed using a 5-point scale (1 =not like me at all, 5=very much like me). Four items described the tendency toward sustained effort for long-term goals, and four other items described abiding focused interests over time (Von Culin, Tsukayama, & Duckworth, 2014).

Talent, Personality and Performance

Studies conducted by Duckworth et al. (2009) indicated that grit can be a predictor of success over and beyond talent. According to Duckworth and her colleagues, students who have drive, stamina, perseverance, and capacity for hard work did not necessarily have aptitude and talent too (Duckworth et al., 2007; Duckworth & Seligman, 2006; Duckworth et al., 2011).

> Talent and drive are personal attributes that are not necessarily correlated. Many individuals with less raw potential but greater stamina, perseverance and capacity for hard work are more likely to succeed than those who are talented but have little capacity to set ambitious goals for themselves and to keep focused on achieving them. (Zimmerman & Schunk, 2011, p. 56)

If students never encountered failure and were never challenged, they would be unable to cultivate stamina, perseverance and motivation which were needed to thrive in challenging conditions (Dweck, 1975; Dweck & Master, 2009). Students would never discover the sense of flow that comes from being fully immersed in purposeful effort and

the pleasure that came from being completely and utterly focused on the task at hand (Csikszentmihalyi, 1990). In talent, grittier individuals were typically equal or inferior to their less gritty counterparts (Duckworth et al., 2007).

Students who considered themselves intelligent did not think that they needed to cultivate their intelligence to make it flourish, and those who believed that they lacked intelligence were not inclined to work hard to overcome initial difficulties (Rattan, Savani, Naidu, & Dweck, 2007; Dweck, Walton, & Cohen, 2013). Intelligence was the best-acknowledged interpreter of achievement (Gottfredson, 1997; Hartigan & Wigdor, 1989). Reliable and valid measures of IQ have made it possible to document a wide range of achievement outcomes affected by IQ. These included college and graduate school grade point average (GPA) (Bridgeman, McCamley-Jenkins, & Ervin, 2000; Kuncel, Hezlett, & Ones, 2001), induction into Phi Beta Kappa (Langlie, 1938), income (Fergusson, Horwood, & Ridder, 2005), career potential and job performance (Kuncel, Hezlett, & Ones, 2004), and choice of occupation (Chown, 1959).

There was evidence that personality, explicitly, the Big Five factors (agreeableness, conscientiousness, extraversion, neuroticism, and openness) were related to an assortment of outcomes, including health behaviors and personality disorders as well as academic and work outcomes (John et al., 2008). Zeider (2009) reported that conscientiousness and openness were positively related, neuroticism and extraversion were negatively related, and agreeableness was unrelated to educational outcomes for college students. Noftle and Robins (2007) observed that openness was the strongest predictor of SAT scores and that conscientiousness accounted for unique variance in

college GPAs even after controlling for the effects of gender, high school grades, SAT scores, and the other four Big Five factors.

Extraversion, agreeableness, and neuroticism accounted for unique variance in college GPA and SAT verbal scores (Noftle & Robins, 2007). Academic achievement was assessed through measuring the degree of each student's institutional learning through his/her scores (Seif, 2001). Duckworth et al. (2007) tested the hypothesis of grit and how it would be unrelated to IQ. The researchers learned little about how personality traits and intelligence were related and about their relative contributions to performance (Duckworth et al., 2007). What was found were notable exceptions to the trend (Ackerman & Heggestad, 1997; Chamorro-Premuzic & Furnham, 2005).

Personality traits correspondingly influenced academic achievement (Komarraju et al., 2011). The personality trait of grit, defined as the tendency to pursue long-term goals with sustained zeal and hard work, was shown to predict achievement in academic, vocational, and avocational domains (Duckworth et al., 2007; Duckworth & Quinn, 2009; Duckworth et al., 2009). Personality traits such as grit described tendencies to act, think, and feel that were relatively stable over time and situation (Roberts, Harms, Smith, Wood, & Webb, 2006).

Costa, McCrae, and Dye (1991) described conscientiousness "as having both proactive and inhibitive aspects" (p. 887) with the proactive aspect including such traits as "Need for achievement and commitment to work" (p. 887). Conscientiousness has consistently appeared as a stable predictor of exam performance (Chamorro-Premuzic & Furnham, 2005) and grade point average (GPA) (Conrad, 2006). The Big Five combined traits were found to predict various educational outcomes (Komarraju et al., 2011).

Conscientiousness and openness predicted course performance (Paunonen & Ashton, 2001) and agreeableness, conscientiousness, and openness predicted overall academic performance (Poropat, 2009).

Extraversion, openness and conscientiousness was found to predict grade point average (GPA), more importantly, when students applied previously accumulated knowledge to real life settings (Lievens, Ones, & Dilchert, 2009). There was a difference in the preferred styles of thinking, processing information, and acquiring knowledge (Schmeck, 1999; Zhang, 2000). Lockhart and Schmeck (1984) reported that a number of students suggested that individual differences in learning styles were predictive of student performance. Entwistle and Waterston (1988) concluded from their research that the learning strategies most advantageous to course performance and cumulative GPA included active thinking and organized studying, synthesis-analysis (Miller, Always, & McKinley, 1987), deeper levels of reflection (Jakoubek & Swenson, 1993), and elaborate processing (Hall, Hladkyi, Perry, & Ruthing, 2004).

Academic performance, determined by the direct demonstration of declarative and procedural knowledge after having engaged in many other complex and ill-defined tasks; that was the knowledge recently acquired through a number of different and complex tasks that occurred both within and outside of the classroom (Kuncel et al., 2004). The importance of educational accomplishment, primarily in high school completion, cannot be minimized (Saunders et al., 2004). Academic achievement was assessed through measuring the degree of each student's institutional learning through his/her scores (Seif, 2001). According to Pascarella and Terenzini (2005) academic performance was found to be the single best represented variable of students persisting through graduation and an

essential focus was on various influences affecting student's academic performance in an effort to better understand and increase student persistence.

A study conducted by Eskries-Winkler, Shulman, Beal, and Duckworth (2013) examined the predictive validity of grit for graduation from the Chicago Public Schools. The study established demographic predictors of high school graduation, which included race (Jordan, Lara, & McPartland, 1996), gender (Jordan et al., 1996; Swanson, 2004) and socioeconomic status (Diamond et al., 2000). Other factors included graduation as a strong predictor by situational factors, including safety (Diamond et al., 2000), teacher support (Brewster & Bowen, 2004; Catterall, 1998; Croninger & Lee, 2001; Lee & Burkman, 2003), parental support (McNeal, 1999), and peer support (Kasen, Cohen, & Brook, 1998). Eskreis-Winkler et al. (2013), examined whether students' grit, measured during their junior year, predicted graduation following their senior year from the Chicago Public Schools.

Participants in the study endorsed four items from the Short Grit-Survey (Duckworth & Quinn, 2009). Results indicated that gritty juniors were more likely to graduate from high school their senior year (Eskreis-Winkler et al., 2013). It was also found that grit was strongly correlated with both academic conscientiousness (r = .49) and school motivation (r = .49) (Eskreis-Winkler et al., 2013).

Summary

Grit, defined as the tendency to pursue long-term goals with sustained zeal and hard work, was shown to predict achievement in academic, vocational, and avocational domains (Duckworth et al., 2007; Duckworth & Quinn, 2009; Duckworth et al., 2009). In 2009, Duckworth found that grit predicted effectiveness and the concept of grit was

largely unrelated to talent (Locke & Latham, 2006). Big Five grit traits of neuroticism, extraversion, openness, agreeableness, and conscientiousness were related to a wide range of behaviors (Ozer & Benet-Martinez, 2005), including academic achievement and job performance (Costa & McCrae, 1992). Although there were strides made to define grit as coined by Duckworth, there was little research on how grit related to student achievement. This study presents resources that will explain a possible difference in the level of grit between students that attended a non-traditional technical school and those that attended a traditional high school. Chapter Three will describe the study design and procedures as well as identify the key factors in determining grit and academic performance

Chapter Three: Methodology

Introduction

This study explored the possible difference in the level of grit among students who attended a non-traditional technical high school and students who attended a traditional high school. The purpose of this study was to investigate a possible difference in the level of grit, as defined by Duckworth and Quinn (2007), among students who attended a non-traditional technical high school and those that attended a traditional high school.

Instrumentation.

In this study, the researcher used the eight-item Grit-Survey (Duckworth et al., 2007). The Short Grit-Scale (Duckworth & Quinn, 2009), utilized for the purpose of this study, though shorter in length was noted by Duckworth and Quinn (2009) to be psychologically stronger than the 12-item Grit-Scale.

The wording of the questions and directions of the survey used in this study were taken from the survey validated by Duckworth and Quinn (2009). Appendix A contains a list of the eight items measured on a 5-point Likert scale, from 1 representing 'not at all like me' to 5 representing 'very much like me'. Responses to each question had a corresponding point value, ranging from 1 to 5. The maximum score assigned to each survey was 5 representing 'extremely gritty', and the lowest score was 1 representing 'not gritty at all' (Duckworth & Quinn, 2009). Each item had a point value chosen on the Likert scale by the student. These were added together and divided by 8 to compute the student's average level of grit. The Grit-S survey was found to hold appropriate levels of psychometric properties (Duckworth & Quinn, 2009). Evidence of its constructs and

predictive validity, internal consistency ranging from 0.73 to 0.83, computed across four different samples (Duckworth & Quinn, 2009), medium to strong predictive validity, with unstandardized regression coefficients associated with grit scores predicting student performance ranging from 0.22 to 0.55, with an associated odds ratios ranging from 0.80 to 1.73 (Duckworth & Quinn, 2009).

Procedures

The researcher based the study on quantitative and qualitative data obtained from each high school. Data were primary and collected during the course of study. The researcher obtained demographic data from the Student Information System, K12, utilized at both high schools. The requested data, which were de-identified, included student gender and were used to randomly select participants for the Grit-S survey. The researcher collected responses on the Grit-S survey through a web-based program, Survey Monkey. The researcher invited 100 high school students at both high schools to take the survey. Students under the age of 18 were given parental consent forms and were asked to have the forms returned within a two- week period. Students 18 years and older were given consent forms and asked to have the forms returned within a two-week period. Students at Technical High School were reminded via morning announcements to return their forms, after one week. An assigned administrator reminded students at Traditional High School to return their permission forms.

Individual responses to each of the eight Grit-S survey questions were obtained from randomly selected samples of students from each high school via a web-based program, Survey Monkey. Each response was tabulated, based on a 5-point Likert scale

and recalculated to the appropriate point value determined by Duckworth and Quinn's (2009) process.

The teacher interview questions (Appendix E) were created based upon gaining the teachers thoughts about grit and how they would define grit. The commonality of the definition of grit amongst teachers interviewed was a student's determination and/or motivation towards a specific goal. All 27 of the interviews were conducted face-to-face, with one exception, which was conducted via email. The researcher scripted the responses. The teacher interview responses were qualitatively coded using open coding. Common themes emerged from the data.

Background of Study Sites

Technical High School. The researched Career and Technical High School within School District A was in Midwest County (Special School District of Study District County, 2014, p. 1). The Midwest County voters passed a referendum establishing a local public school to support the educational needs of children with disabilities. The votes effectively established School District A, which began with four teachers and one social worker in the fall of 1958. Students were taught in schools owned and operated by other school districts; however, in 1961 the district opened its doors to its first school wholly run by School District A, instead of as part of the other district's school. At the time of this writing, School District A operated five special schools. In the 1960s, School District A sought to move into technical education, a mission that was separate from the district's work in the field of special education. In 1966, School District A began providing technical education, and in the fall of 1967, the district opened its first technical high school. A year later, the district opened its second technical high school.

The technical high schools were created to place focus on CTE, by first providing programs geared towards students working towards a career or technical skill. The Technical High School offered over 30 career and technical majors, including the following: advanced manufacturing, arts and communication, business information and technology, construction, human services, medical and animal sciences, and public safety and transportation (Study Site High School B, 2014, p. 1). The Technical High School offered both half and full-day programs. The Technical High School accepted 10th through 12th grade students. Full-day students were scheduled in academic and career or technical programs; whereas half-day students were scheduled in a career or technical programs only and received academic classes at their home schools. The Technical High School had an admissions process that required students to meet a specific criterion prior to acceptance into the technical school. Those requirements included, for sophomores, at least seven high school academic credits. Juniors and seniors were accepted providing they met the academic requirements for their grade levels. School District A provided CTE to approximately 2,000 area high school students at the districts two technical schools (Special School District of Study Site County, 2014, p. 1). At the time of this writing, School District A has 521 certified high school staff with an average salary of $63,760 with 14.7 years of experience. School District A has 49.3% of their high school teachers with Masters Degrees or higher (MODESE, 2015).

Traditional High School. The Traditional High School was the only high school in School District B. School District B was among the oldest school districts in Midwest County and was founded in 1865. Once a one-race school district, School District B integrated its schools in 1955 after the U.S. Supreme Court decision in *Brown v. The*

Board of Education (Study Site High School A, 2014, p. 1). In 1955, Traditional High School opened with a campus designed to mimic a college campus. At the time of this writing, the high school had a total enrollment of 1,823 students. The student to teacher ratio was approximately 20 students per one teacher. The district had 167 certified high school staff within its one high school. The average salary of high school teachers in this School District B was $72, 857, with 15.3 years of experience. Additionally, the district had 90.8% of their high school teachers with masters' degrees or higher (MODESE, 2015, p. 1).

Population and Participants

The researcher drew samples for this study from two public high schools, one a traditional high school and one a non-traditional technical high school. The approximate size of the traditional high school was 1,823 with 47% female population and 53% male population (MODESE, 2015). The approximate size of the non-traditional technical high school was 1,025 with 52% female and 47% male (MODESE, 2015). In order to be included in the study, students must have completed all eight items of the Grit-Survey, with prior parental consent if they were under the age of 18 and must have completed a consent form for participation if they were 18 years-of-age or older. The focus for this study was to research the level of grit amongst students who attended a traditional high school with students that attended a non-traditional technical high school.

One hundred students from Technical High School and 100 students from Traditional High School were selected to participate in the eight-item Grit-Survey. The 200 students were randomly selected using their school district's electronic student information system.

Teachers and administrators from Technical High School and Traditional High School participated in interviews for the study. Teachers from each school were asked via electronic email to volunteer to be interviewed by the researcher. From the volunteers, 10 teachers from each participating school were chosen to be interviewed by the researcher. Eight total administrators between the two high schools also agreed to be interviewed for the study. Five were from Traditional High School and three from Traditional High School

Research Questions

RQ1: How do secondary educators and principals in a traditional high school setting perceive grit among their students?

RQ2: How do secondary technical school educators and principals in a non-traditional high school setting perceive grit among their students?

Hypotheses

H1: There will be no difference in the level of grit among students who attend a non-traditional technical school and students who attend a traditional high school, as measured by the Grit-S Survey.

H2: There will be no difference in the level of grit among male and female students that attend a non-traditional technical or traditional high school.
Data was not appropriately disaggregated to allow analysis of this hypothesis, H2, therefore analysis was not completed and H2 was dropped from the study design.

Data Collection and Analysis Procedures

The Short Grit-Scale (Grit-S) with the best overall predictive validity across four samples originally presented in Duckworth et al. (2007) was utilized in this study.

Permission was granted from the Administrator of Program Evaluation and New Initiatives to use the Grit-S in this research project. Data collected were scrubbed of identifying information, except for gender. Students completed the survey on computers in a computer lab located on the campus of their home high school. One hundred randomly selected students from each identified high school completed the survey via Survey Monkey. Results were analyzed using a *z*-test for difference of means to contribute to understanding the students' Grit scores as related to their high school attendance.

All twenty-seven of the interviews were conducted face to face, with one exception that was conducted via email. The researcher scripted the responses. The teacher interview responses were qualitatively coded using open coding. Common themes emerged from the data.

Summary

The study used students and teachers from two different high schools as participants. The first was a non-traditional technical high school. The second was a traditional suburban high school. One hundred students and ten teachers from each school participated in the study. In addition, seven, total administrators participated in the study. Data were gathered from the students via the Grit-S survey. The teachers participated in a researcher-designed interview. Data and analysis is presented in Chapter Four.

Chapter Four: Results

Introduction

One hundred students from each high school Technical High School and Traditional High School, participated in this study by completing a Grit-S survey. This chapter will present the data from those surveys along with the analysis and comparison of those results. Ten teachers and selected administrators from each school participated in an interview with the researcher. The results and analysis of their interviews will follow that of the students. The purpose of this study was to explore a possible difference in the level of grit, as defined by Duckworth, among students who attended a non-traditional technical school and those who attended a traditional high school.

Research Questions and Null Hypothesis

RQ1: How do secondary educators and principals in a traditional high school setting perceive grit among their students?

RQ2: How do secondary technical school educators and principals perceive grit among their students?

$H1_0$: There will be no difference in the level of grit among students who attend a non-traditional technical school and students who attend a traditional high school, as measured by the Grit-S Survey.

Data Collection

The descriptive statistics of the study variables were summarized using the statistical results from the web-based program, Survey Monkey. The traditional high school enrolled 1,823 students for the Fall 2014- 2015 school year. Of the 1,823 students enrolled, 100 students participated in the Grit-Survey. The non-traditional technical high

school enrolled 1,025 students for the Fall 2014-2015 school year. Of the 1,025 students enrolled, 100 students participated in the Grit-Survey. The sample of 100 students was adequate in finding the significance of grit on student academic achievement. The Grit-Survey was given via a web-based program, Survey Monkey.

The school counselor from both high schools were consulted and assisted by randomly selecting student participants via their high school database systems, School Information System (SIS). A parent meeting was held and information about the study was thoroughly introduced to parents. Students who were under the age of 18-years-old were given a consent form to obtain permission for participation from their parents. Students 18 years and older did not require a parental consent form, but signed a form agreeing to participate in the study. Students were given The Likert Grit-Scale as designed by Duckworth et al. (2007), in an effort to determine their levels of grit.

Ten teachers from each participating school were chosen from those who volunteered to be interviewed by the researcher. Five administrators from Traditional High School and three administrators from Technical High School were interviewed, as well. The interview questions (Appendix E) were created based upon gaining the teachers thoughts about grit and how they would define grit. Questions included:

- Question One: How would you define grit?
- Question Two: How would you describe a student's specific attitude, behaviors, and academic competence related to your definition of grit?
- Question Three: How should a teacher display the attitudes, behaviors, and academic competence related to your definition of grit?

- Question Four: What actions should an administrator display in the attitudes, behaviors, and academic competence related to your definition of grit?

Student Response Data: Non-Traditional Technical High School

Figure 1 represents student responses to question1, ‘New ideas and projects sometimes distracts me from previous ones.’ The majority response to this question was 64% answering ‘very much like me’. Nine percent marked the answer ‘not much like me.’

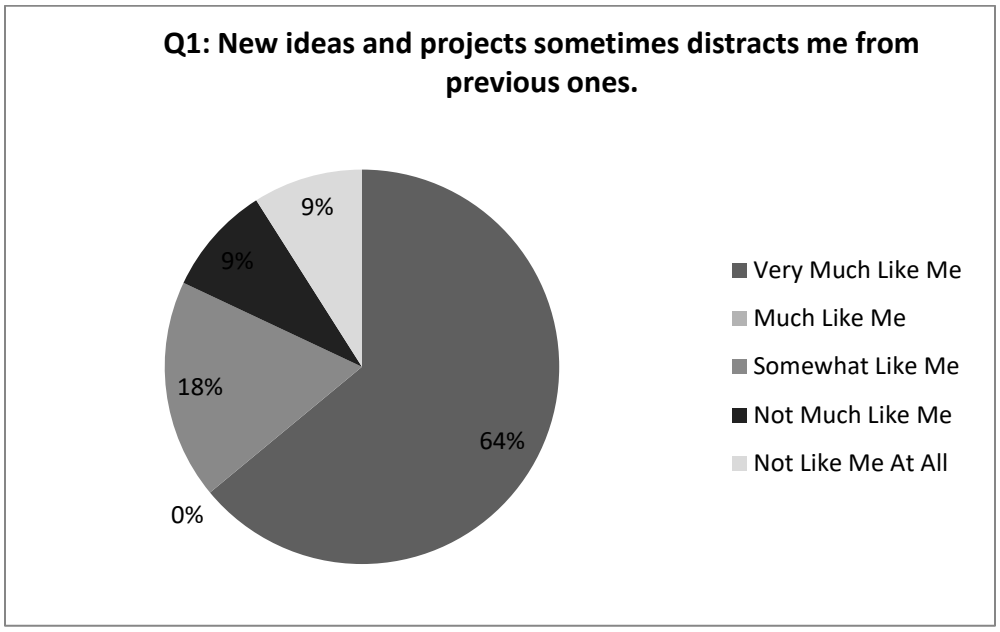

Figure 1. Question 1 of student responses.

Figure 2 represents student responses to question 2, ‘Setbacks (delays and obstacles) don’t discourage me. I bounce back from disappointment faster than most.’ The majority response to this question was 51% answering ‘very much like me.’ Seven percent marked the answer ‘not much like me.’

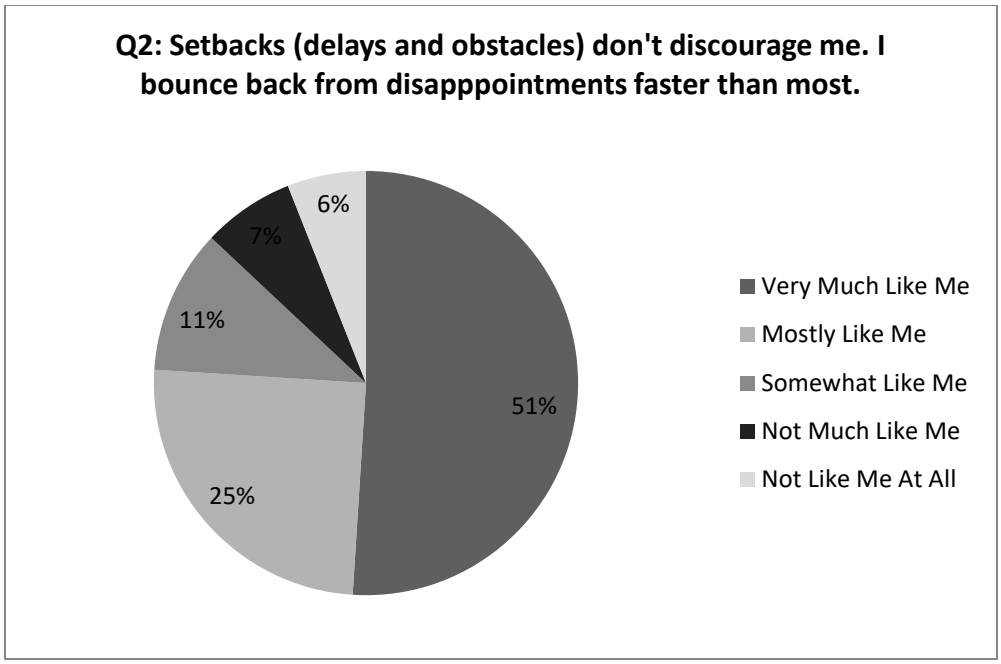

Figure 2. Question 2 of student responses.

Figure 3 represents student responses to question 3, 'I have been obsessed with a certain idea or project for a short time but later lost interest.' The majority response to this question was 32% answering 'very much like me.' Twenty-three percent marked the answer 'not much like me.'

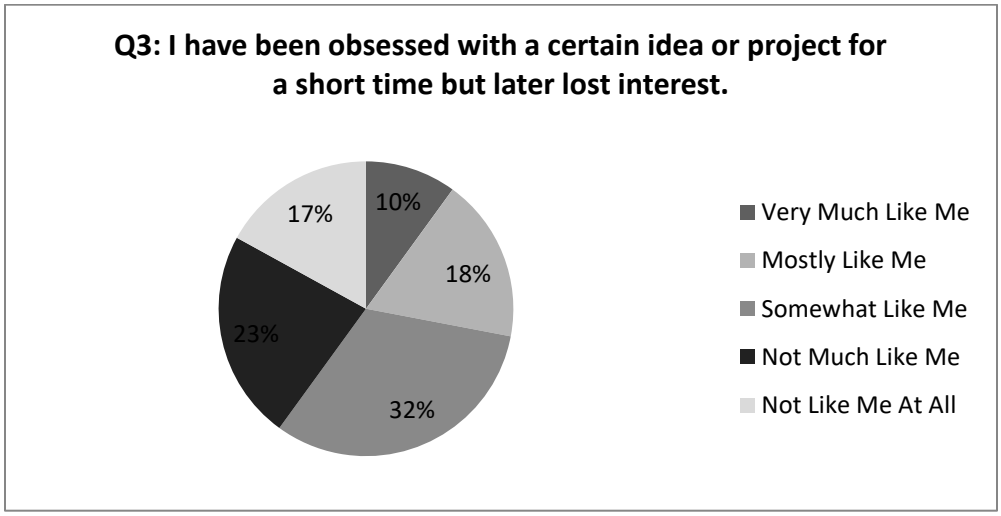

Figure 3. Question 3 of student responses.

Figure 4 represents student responses to question 4, ‘I am a hard worker.’ The majority response to this question was 82% answering ‘very much like me.’ Two percent marked the answer ‘not like me.’

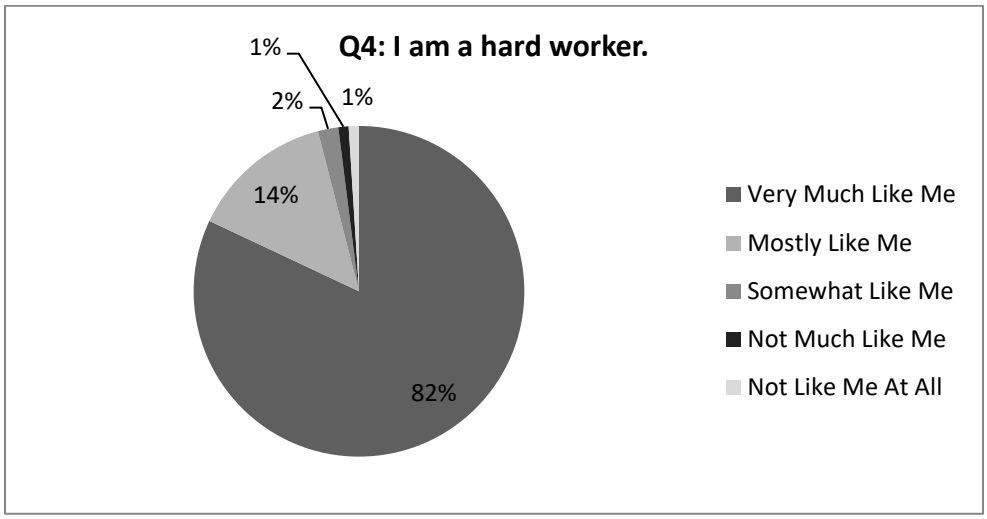

Figure 4. Question 4 of student responses.

Figure 5 represents student responses to question 5, ‘I set goals but later choose to pursue (follow) a different one. The majority response to this question was 6% answering ‘very much like me.’ Thirty-eight percent marked the answer ‘not much like me.’

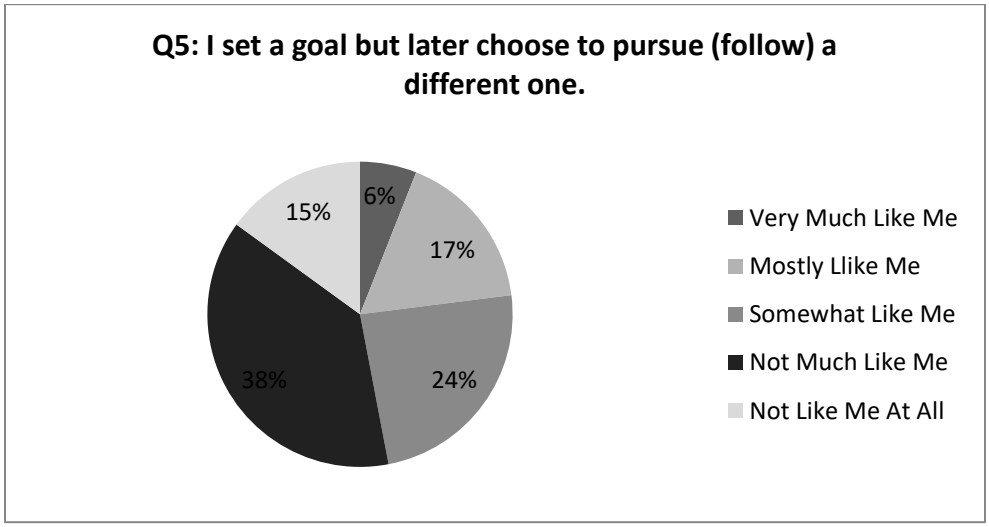

Figure 5. Question 5 of student responses.

Figure 6 represents student responses to question 6, 'I have difficulty maintaining (keeping) my focus on projects that take more than a few months to complete.' The majority response to this question was 25% 'not much like me.' Eight percent marked the answer 'very much like me.'

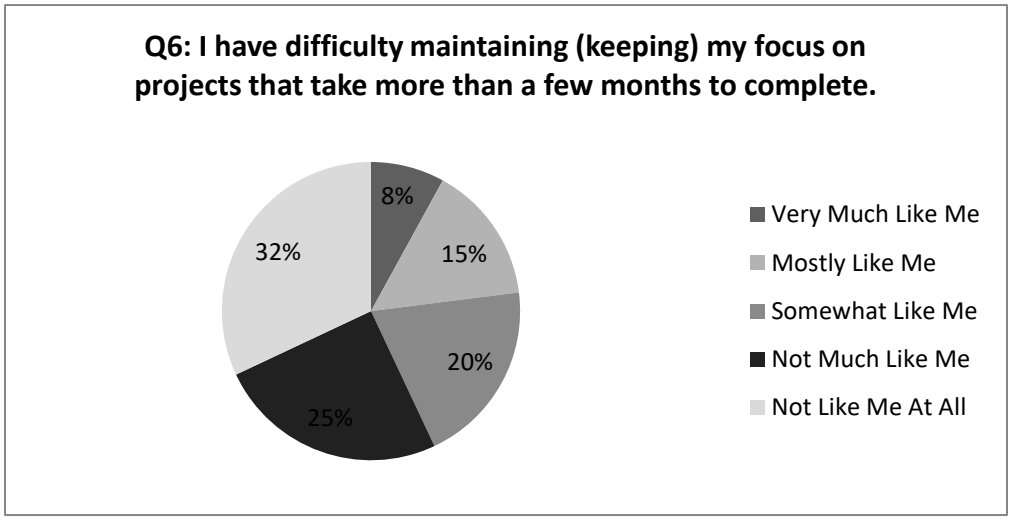

Figure 6. Question 6 of student responses.

Figure 7 represents student responses to question 7, 'I finish whatever I begin.' The majority response to this question was 62% answering 'very much like me.' Two percent marked the answer 'not much like me at all.'

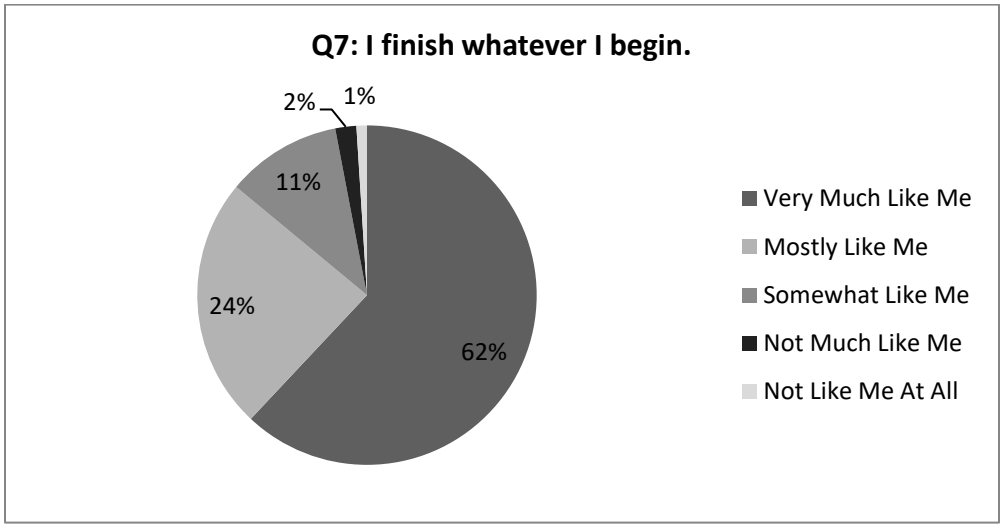

Figure 7. Question 7 of student responses.

Figure 8 represents student responses to question 8, ‘I am diligent (hardworking and careful). The majority response to this question was 79% answering ‘very much like me.’ Three percent marked the answer ‘somewhat like me.’

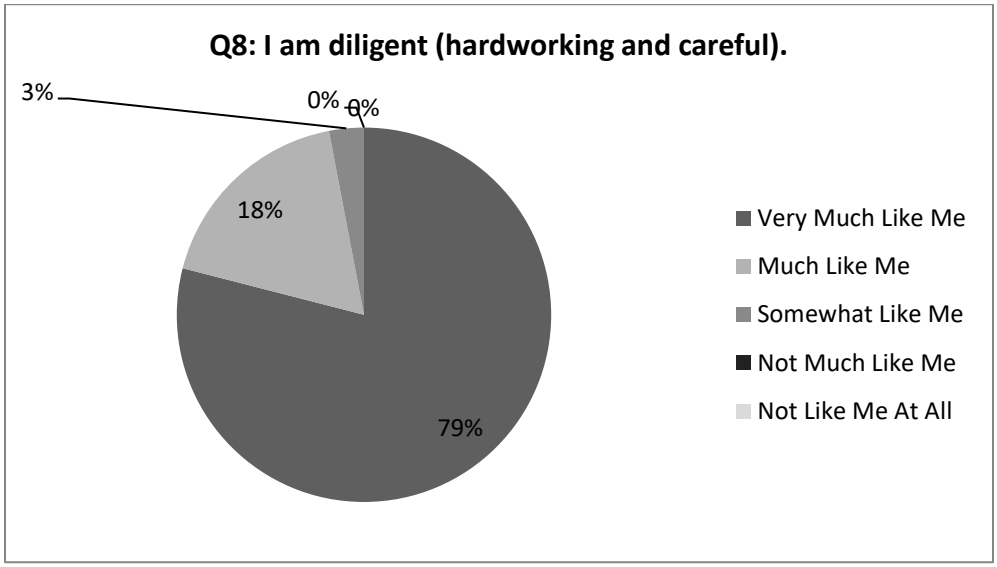

Figure 8. Question 8 of student responses.

Student Response Data: Traditional High School

Figure 9 represents student responses to question 1, ‘New ideas and projects sometimes distract me from previous ones.’ The majority response to this question was 57% answering ‘somewhat like me.’ Ten percent marked the answer ‘not much like me at all.’

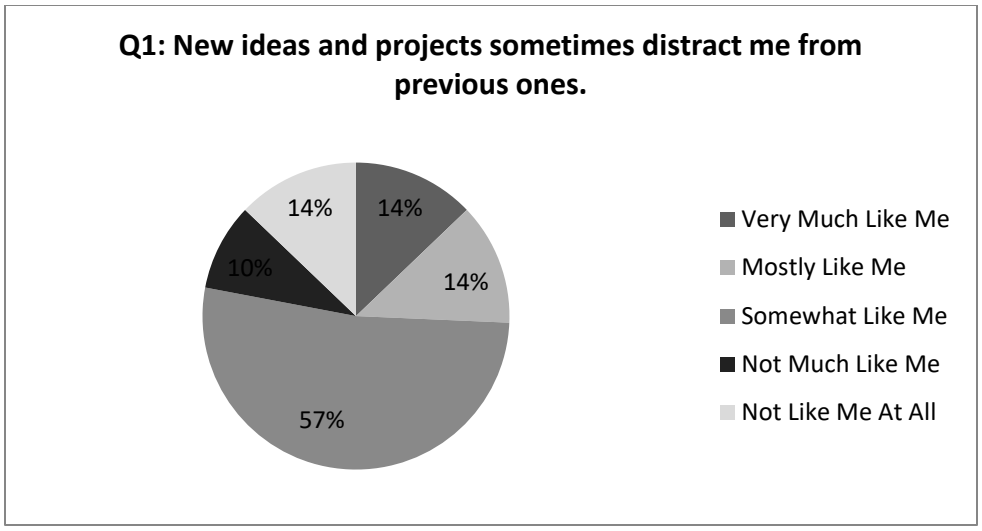

Figure 9. Question 1 of student responses.

Figure 10 represents student responses to question 2, 'Setbacks (delays and obstacles) discourage me. I bounce back from disappointment faster than most.' The majority response to this question was 36% answering 'mostly like me.' Two percent marked the answer 'not like me at all.'

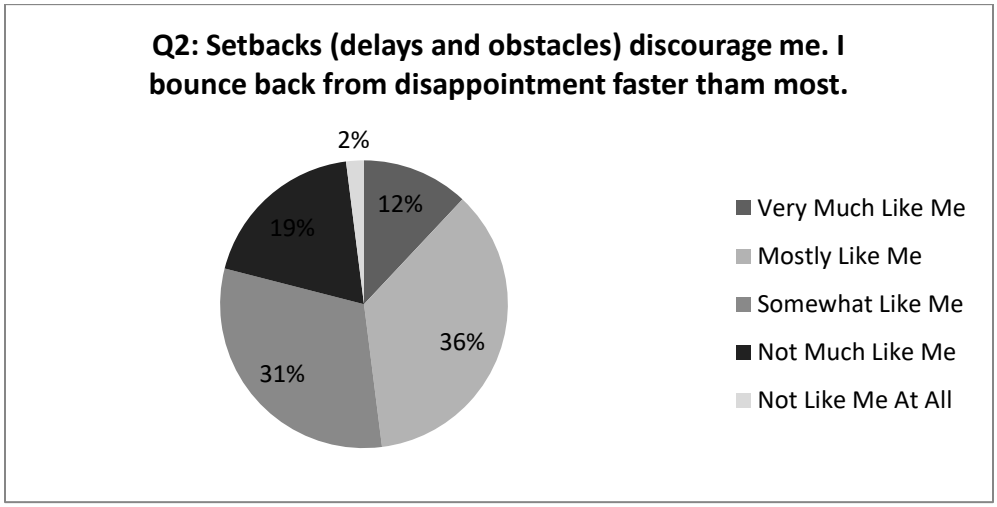

Figure 10. Question 2 of student responses.

Figure 11 represents student responses to question 3, 'I have been obsesses with a certain idea or project for a short time but later lost interest.' The majority response to

this question was 34% answering ‘somewhat like me.’ Seven percent marked the answer ‘very much like me.’

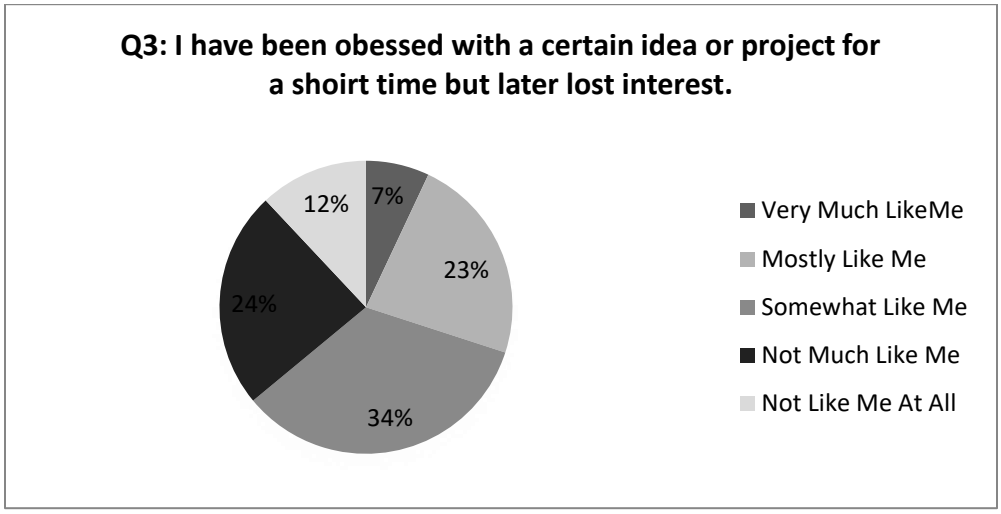

Figure 11. Question 3 of student responses.

Figure 12 represents student responses to question 4 ‘I am a hard worker.’ The majority response to this question was 44% answering ‘very much like me.’ Two percent marked the answer ‘not much like me at all.’

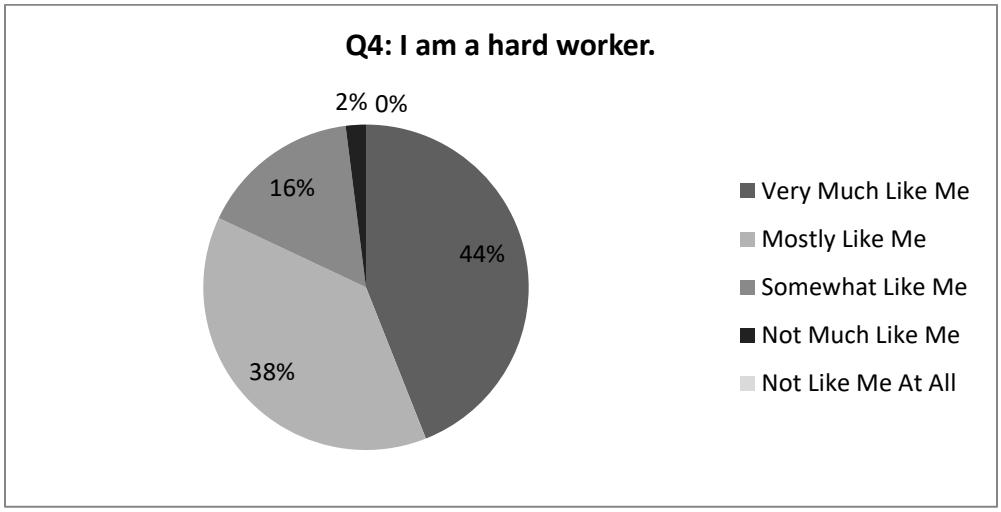

Figure 12. Question 4 of student responses.

Figure 13 represents student responses to question 5, ‘I often set a goal but later choose to pursue (follow) a different one.’ The majority response to this question was

40% answering ‘somewhat like me.’ Two percent marked the answer ‘very much like me.’

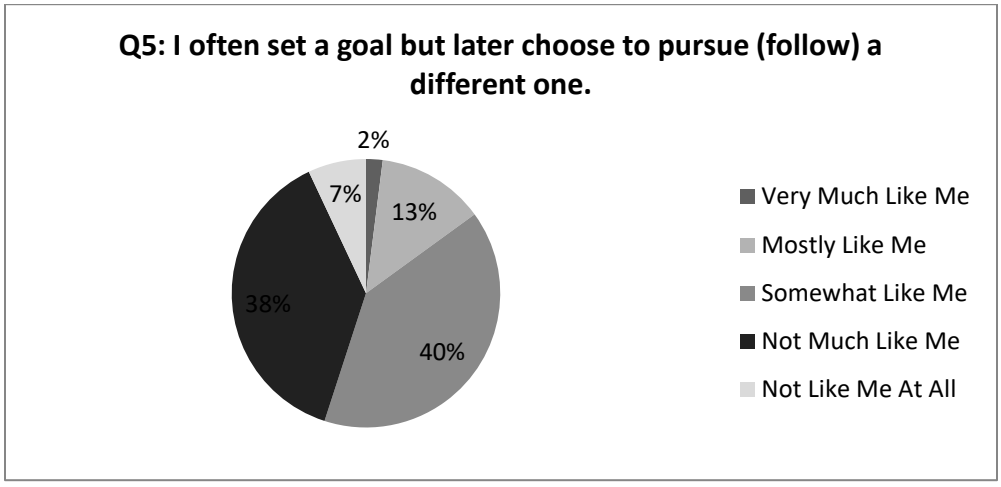

Figure 13. Question 5 of student responses.

Figure 14 represents student responses to question 6, ‘I have difficulty maintaining (keeping) my focus on projects that take more than a few months to complete.’ The majority response to this question was 34% answering ‘not much like me.’ Four percent marked the answer ‘not like me at all.’

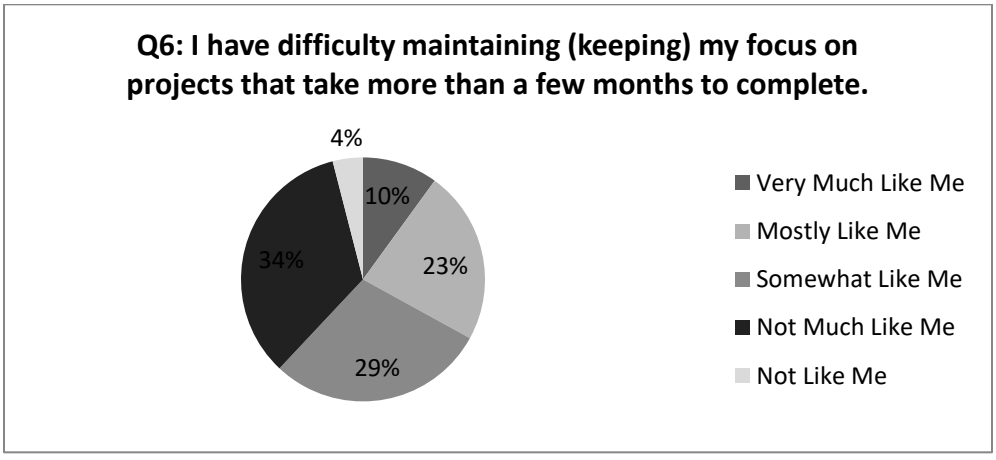

Figure 14. Question 6 of student responses.

Figure 15 represents student responses to question 7, ‘I finish whatever I begin.’ The majority response to this question was 45% answering ‘mostly like me.’ Five percent marked the answer ‘not much like me.’

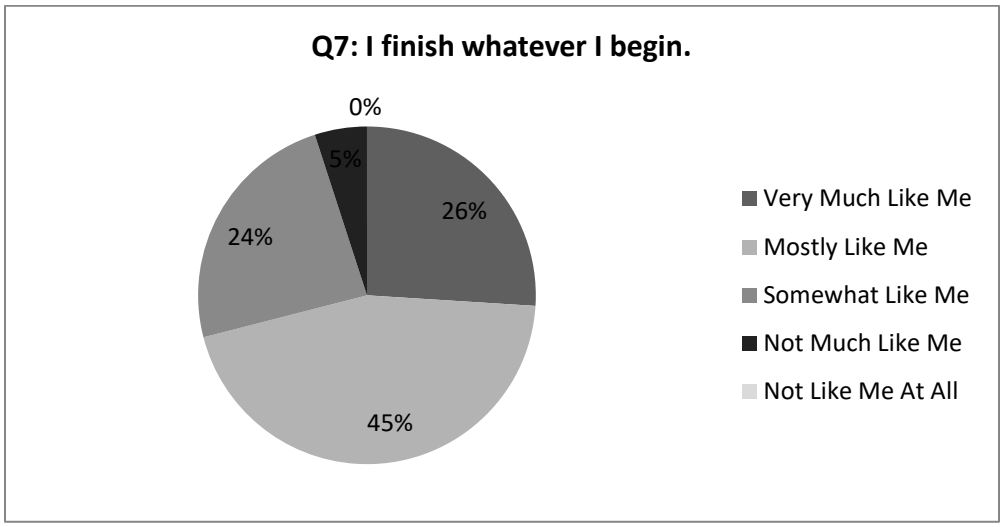

Figure 15. Question 7 of student responses.

Figure 16 represents student responses to question 8, ‘I am diligent (hardworking and careful). The majority response to this question was 44% answering ‘mostly like me.’ Two percent marked the answer ‘not like me at all.’

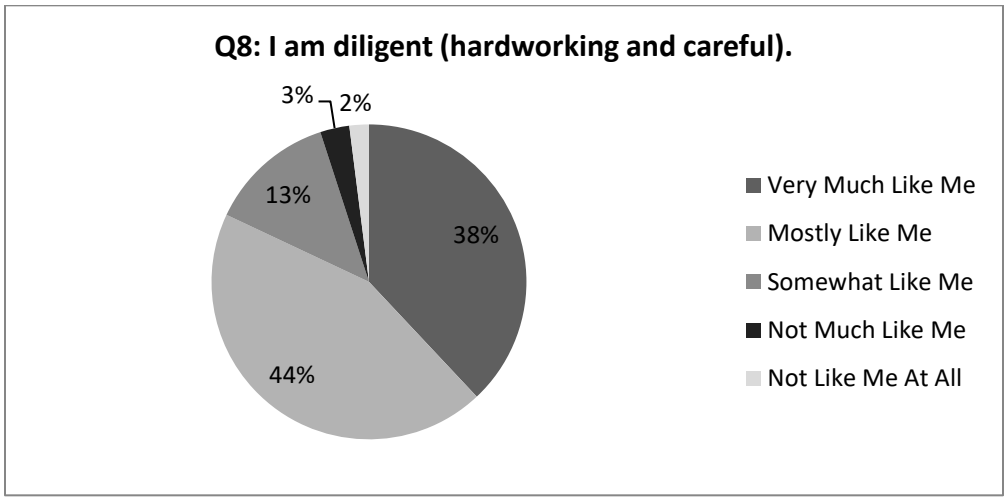

Figure 16. Question 8 of student responses.

Teacher Responses

Teachers from the traditional high school had an average of 15.3% years of teaching experience, with a student-to-teacher ratio of 20 students to one classroom teacher (MODESE, 2015). Teachers from the non-traditional technical high school had an average of 14.7% years of teaching experience with a student to teacher ratio of 38 students to one teacher (MODESE, 2015, p. 1).

Question One: How would you define Grit?

Responses from the Traditional High School

Teacher T1: Teacher T1 defined grit as, "Students with grit don't give up. They may get tired and frustrated, but they don't quit in the face of these feelings. There's something in students with grit that says, keep going and it will get better." She further explained, "Students with grit aren't necessarily the students with the highest IQs or the highest grades they are students who somehow know that, ultimately, they are in control of their own outcomes." In describing these students she stated, "Students who have messy rooms, dumpster-like backpacks, who miss deadlines, etc., can also have grit. They persevere even though they can't seem to keep track of assignments; they stick with the work even if it's challenging."

Teacher T2: Teacher T2 stated,

> Too often, I see students who have not been allowed to fail. For these students, failure isn't a chance to improve but rather is a catastrophic consequence. For this reason, they either don't try to do things where failure is an option, or they work to completion but not to the finish.

Teacher T3: Teacher T3 spoke to the presence of motivation as important to grit. She said,

> Grit for high schoolers had to be intrinsically motivated. As teachers, we can provide the tools and temporary motivation, but if we can show value and authenticity in what we ask them to do, their buy-in and grit-level rises.

Teacher T4: The next teacher, T4, expressed a need for growth in the student, as well as faith in her own abilities. She stated,

> I think a growth mindset is the building block of gritty academic behavior. I believe that students that play sports and have seen the value of practice have more faith in their ability to grow and get better. In addition to faith in one's self, I also think a little humility helps. I believe that the core of education is change; people who are open to change and not overly sure of their beliefs are more apt to change due to education.

Teacher T5: Teacher T5 provided only a brief definition. He said, "Students in my experience that demonstrate grit tend to come closest to their potential in athletics and academics. In their daily experiences they chose to remain engaged in the work as opposed to giving up or losing interest."

Teacher T6: This teacher described what grit looked like in a student. He said,

> Students would display grit with a 'can do' attitude, a fight to understand instead of giving up, and a motivation to dig deeper for the 'why.' Kids with grit are the ones that show up when they don't feel best, complete homework even when it doesn't count for points, ask for help when they don't understand, and truly value their education.

Teacher T7: Teacher T7 gave a very concise and traditional definition of grit. She stated, “I have come in direct contact with students that are determined and motivated to complete assignments and make good grade because they have planned their academic careers beyond high school.”

Teacher T8: This brief definition by NT8 still got to the heart of grit in a student. She stated, “A student can display grit when learning. Showing heart, courage, or just a strong toughness of getting the concept of something is a great example.”

Teacher T9: The requested definition was made by providing an example of what grit might look like in a student athlete. He said,

> Student athletes are a great example of students that display characteristics of grit. A student’s attitude would have to be positive with a keen sense of motivation and determination. They should have a proven academic track record that they are headed towards success.

Teacher T10: Teacher T10 echoed the previous comments about the need for growth to be in evidence. She stated,

> Students should have a growth mindset over a fixed mindset. Students should possess an openness to learn and be life- long learners; they should never settle. Students should be optimistic about their academic career and strive for excellence at all times.

Responses from the Non-Traditional High School

Teacher NT1: Teacher NT1 very briefly described grit as, “A student’s level of motivation to complete a certain task given to him or her.”

Teacher NT2: Teacher NT2 was very direct in stating, “Grit is an individual’s persistence on a given assignment. This individual never gives up and continues to strive for success.”

Teacher NT3: Teacher T3 gave a specific example of grit while defining grit as, “your personal motivation to attain a specific goal.” She stated that she observes students giving up easily very often. “An example of grit is a student that is continuing to strive to success despite their challenges.”

Teacher NT4: Teacher T4 briefly defined grit as, “Never giving up even if you feel that the challenge is too hard.”

Teacher NT5: This teacher described grit as, “One’s ability to continue to strive for success despite their failure.”

Teacher NT6: Teacher NT6 used a metaphor to define grit by stating that grit is, “To keep it moving even if you feel like the project is too hard for you. Grit is getting down and dirty with the challenge and ending up on top of the mountain.”

Teacher NT7: Though her definition was not long teacher NT7 spoke volumes when she stated, “Grit is never allowing your frustrations to trump your success.”

Teacher NT8: Teacher NT8 spoke passionately about her definition of grit. She definitively described grit as “A student’s determination and motivation towards a specific task.” She further explained that gritty students stand up to a challenge and fight until the end.

Teacher NT9: Teacher NT9 spoke about success when he describe grit. He explained that, “Grit is a student’s attitude in how they value success.” He continued with a meaning that described the gritty student as, “Motivated to the point where failure is not an option for them. They keep going until they reach success.”

Teacher NT10: Teacher NT10 explained briefly that grit was, “One’s ability to persevere through any challenge and at the end attaining success.”

Question Two: How would you describe a student’s specific attitudes, behaviors and academic competence related to your definition of grit**?**

Responses from the Traditional High School

Teacher T1: Teacher T1 very confidently stated, “Students with grit possess positive attitudes and carrying themselves with a positive demeanor. Often times they are the ones who will ever give up on a given task because they yearn for success.”

Teacher T2: Believing that students should always do their best, Teacher T2 explained that, “A student with grit strives for the best at all times and will not let any challenge veer them away from success.”

Teacher T3: Teacher T3 spoke about the importance of being focused. She said that an attitude of determination and persistence is how she would describe a student with grit. She further explained that a student with grit is, “One that is focused and determined to be successful.”

Teacher T4: Teacher T4 spoke about student motivation. She stated that, “A student with grit is motivated by success and has a hunger to overcome any challenge in which they may encounter.”

Teacher T5: Briefly speaking about student attitude, Teacher T5 explained that, "Students with grit possess positive attitudes that attribute to their success."

Teacher T6: Teacher T6 spoke about grit as it relates to academics. She stated, "Gritty students have attitudes that are motivated by a keen determination to succeed at any task. Gritty students are perfectionists when it comes to their academics and will strive for the A every time."

Teacher T7: By overcoming obstacles, Teacher T7 explained, "Students with grit will successful complete any tasks no matter how difficult the task may be." She further explained that students are motivated by success and are determined to overcome obstacles that may hinder that success.

Teacher T8: Teacher T8 spoke at length about not accepting failure as an option. She stated,

> Students with Grit-Set goals and work very hard to attain those goals. They are the students with the positive attitudes and seek out help when needed because they want very much to succeed. Failure is not an option with these students.

Teacher T9: The need for leadership qualities were the traits that Teacher T9 spoke directly about. She spoke about students as being scholarly. She stated, "Scholarly students that are academically sound and motivated to succeed at all times. They are the leaders and the ones that go above and beyond whatever the task may be in order to achieve success at the end."

Teacher T10: Teacher T10 spoke highly abut students never giving up. She explained,

> A gritty student is one that possess a positive attitude even when faced with a challenge. One that is persistent and determined to complete a project or assignment with accuracy and perfection. One that will never give up and will keep creating new opportunities of success for themselves.

Responses from the Non-Traditional High School

Teacher NT1: Teacher NT1 spoke about the need for positive attitude in conjunction with academic achievement. She stated,

> Attitudes are generally positive with an optimistic and achievable outlook towards learning. Behaviors manifest in a refusal to quit, inability to settle for 'less' and repeated and consistent effort. Academic competence, in my experience, generally equates to achievement beyond one's intellectual ability. The inability to 'settle' produces enhanced academic results.

Teacher NT2: The need to be responsible and to take ownership of their academic performance was the thrust of the comments from NT2. She said,

> A student with grit will take responsibility for their actions, and not blame teachers, administrators, or peers for their short comings. They will understand that failure will happen in the road to success, so when they get a bad grade they will learn where they can improve and keep pushing forward to success not only in school, but in life.

She went on to describe a sort of determination needed in the students in order to achieve success. "Students with grit will find a way to learn the material, pass the test, write the paper, or do whatever is being asked of them on their way to their goals." The actions needed were described,

> Specifically, they will study for tests, ask questions when they need help, participate in class, go beyond bare minimum requirements in school work, show up every day on time, take notes in class and review them, talk about their future plans, apply for college early, and care about their grades for themselves, not just their parents.

Teacher NT3: NT3 very briefly described visible student actions as, "A student who shows grit is one that shows determination and a strong will when facing a problem, one that does not say I can't but how can I."

Teacher NT4: Teacher NT4 spoke briefly, but forcefully when she stated, "Students should display focus, vision and persistence. They should push past the ordinary and seek extraordinary."

Teacher NT5: Teacher NT5 described a student with grit as, "A student with grit would be persistent, active in his/her education, motivated for success, positive thinker."

Teacher NT6: Teacher NT6 gave a lengthy description of student behavior that ultimately came down to perseverance. He stated,

> In the case of students, especially African American students, whom deal with issues and challenging life circumstances more often than their affluent counterparts, grit is more of an idea than reality. Our students need to feel there is something to be gained from the task before they will 'stick with something.' Being more pleased with completing a project, than mastering a project. So by my definition, students will persevere as long as they have a reason to; passing grade, completion, money, treat etc. Intrinsic grit, the idea of choosing to continuing to

work on a task until it is perfect for self-gratification, is not an attitude most urban students possess.

Teacher NT7: Teacher NT7 focused his visible action description on academics. He said,

> I want my students to be scholars. Attitudes and behaviors of a true scholar will lead to academic competence. A scholar is one who is studying the subject with curiosity and a quest to learn, to grow, to change. A scholar is one who is both fierce and amused by thirst for knowledge.

Teacher NT8: Teacher NT8 did not describe visible student behavior in response to this question. She stated, "I believe that a student who is motivated has a lot of grit because they are determined to succeed no matter what gets in the way."

Teacher NT9: This teacher deviated from the question about students and provided, in part, a description of teacher behavior related to grit. He ultimately came back to the student portion. He said,

> I really believe that if placed in the appropriate learning system, any student can become gritty. Some students already possess grit from either their family systems or perhaps something like playing team sports. Some students, unfortunately, do not. Still, an educator has a chance and a responsibility to model true grit in front of their students. For example, students who don't think they can accomplish a certain task suddenly can learn to set little goals and push to accomplish each one. With every victory, they begin to have some successes and eventually reach their short and long -term goals. It is another way of instilling hope in a student that

can achieve anything if they love what they're going after and they are willing to relentlessly go for it.

Teacher NT10: Teacher NT10 continued her theme of not giving up when she said,

A student who has grit will attempt any task and work until they have completed the task or are told to stop working. A student with grit will not complain when a task is difficult or give up but rather they will accept the challenge and rise to it. A student who has grit is not necessarily more intellectually gifted but rather does not let their ability dictate how hard they work on a task.

Question Three: How should a teacher display the attitudes, behaviors and academic competence related to your definition of grit?

Responses from the Traditional High School

Teacher T1: Teacher spoke openly about the attitudes of teachers. He stated,

Teachers should openly discuss their struggles and how they overcame them so kids can begin to understand that everyone has some kinds of struggle and it's possible to work with/around/through it. Teachers should also put systems in place that support grit. For example, requiring work to be redone if it is not up to standard and building in time to make that happen, allowing test retakes if students show that they've made additional effort to learn the material, and using language that lets kids know the teacher believes everyone is capable of high quality work.

Teacher T2: Teacher T2 strongly spoke about teacher follow through. She said,

> I think that teachers have to practice what they preach. Teachers, like students, need to try new things in class. This means that failure, or a bad lesson are part of the teaching process. In this way, students can see that 'competent adults' work through failures as well.

Teacher T3: Teacher T3 blatantly stated, "Model it. Plain and simple."

Teacher T4: The need for modeling expected behaviors prompted Teacher T4 to explain,

> I personally try to model patience, compassion and humility for my students. Teachers show patience both when they work with students and with difficult problems. Showing some personal humility lets students know that you are not perfect and are amenable to change as well. As far as competence, teachers may not know all the answers, but hey should show dogged pursuit towards them. For example, asking another teacher to help solve a problem, doing an online search, or asking an outside expert.

Teacher T5: Ensuring that learning is taking place, Teacher T5 veered away from the question to explain that "demonstrating lack of success is part of the learning process and allowing the same for students. Learning at the mastery level might require multiple attempts at learning and assessment of that learning."

Teacher T6: Teacher T6 spoke about the needs for teachers to have high expectations. She stated,

> A teacher would show grit by not accepting anything but 100% in work ethic and behavior for themselves and their student. A teacher should show a drive to be right about their content and do right in their job as well as their life outside.

Teacher T7: Teacher T7 simply stated, “Model it.”

Teacher T8: Teacher T8 shared the ideas of her colleagues. She explained, “A teacher should model expectations, professionalism, organizational skills, and have the fortitude to plan and challenge students academically.”

Teacher T9: The need for mental stability in teachers and teacher belief in conjunction with grit is key. Teacher T9 stated, “A teacher must be mentally strong and believe in the students they are teaching. They must be gritty.”

Teacher T10: Teacher T10 stated that, “Teachers must practice what they expect.”

Responses from the Non-Traditional Technical High School

Teacher NT1: Teacher NT1 spoke about the need for teachers to possess positive attitudes. She explained,

> A teacher should portray a positive and optimistic attitude towards achievement and problem solving both curricular and beyond. Teacher behaviors should be consistent with an optimistic and positive attitude and manifest in a willingness to motivate, support, and meet the needs of all learners. Academic competence should be displayed by a teacher with respect to grit in the desire to accurately and precisely answer student questions and admit to a lack of knowledge where one exists. Subsequently, a teacher should direct a learner where or how to locate an answer and also demonstrate the teacher’s own desire for discovery.

Teacher NT2: At length, Teacher NT2 explained several factors that teachers must possess. She stated,

> A teacher must start with defining clear goals for their class so the students know what they are working towards. To help students have a personal connection to the class the teacher should help the students understand how the class goals are linked to their personal goals, so the students understand how the class will help them get what they want.

She further explained that if the teacher knows what the students are trying to accomplish for themselves, it will be easier to push them when things get harder and help students see past the current work to the greater goal. Teachers must also take responsibility for actions and not place blame on everyone else for things that happen in their class. She concluded that the teachers must also not give up themselves. They must have a clear vision of their goals for the class and work every day to see them achieved. “A teacher with grit will give their all every day regardless of how they feel or what is going on in their personal life.”

Teacher NT3: Teacher NT3 briefly stated, “A teacher should use self-reliance and display a positive attitude when it comes to difficult situations.”

Teacher NT4: Being prepared is a key factor when modeling grit according to Teacher NT4. She stated, “Teachers should display preparation, knowledge and concern. You should love what you do or do something else.”

Teacher NT5: Teacher NT5 briefly stated, “The teacher is the model for students to see and understand grit.”

Teacher NT6: Modeling the behavior expected from students was a strong belief of Teacher NT6.

I believe that grit can be modeled by teachers, not taught. If teachers maintain the idea that one method doesn't work (when teaching a topic), keep trying new methods until all students have learned a topic, then students see grit in action.

Teacher NT7: This teacher said,

A teacher with grit has a true love for learning, a desire to see curiosity, growth, and change in their students. She has a determination to give it her all each day and to balance that with the ability to start fresh each and every day.

Teacher NT8: This teacher stated, "A teacher should lead by example and show students their grit in the passion of what they are teaching."

Teacher NT9: Teacher NT9 stated,

I think we should always be willing to model what we seek to develop in our students. I feel like my students can sense my passion for [my subject]. I feel like they feed off my passion, my grit. I think it is transferable. I also know that they know that I am equally passionate about ensuring we do everything possible to prepare them for whatever is next in their lives. I often ask my students to match my passion, my intensity for learning. We use the phrase in class 'My best for your best.' We talk about smart goals. We talk about our preparation for our TSA. Teachers who have grit develop classroom cultures rooted in grittiness.

Teacher NT10: Teacher NT10 echoed the previous comments about modelling when she stated,

A teacher with grit will show students that she is not afraid of hard work. A teacher with grit will let students know that she is willing to accomplish the tasks that she has set out to conquer for the semester regardless of the circumstances. A

teacher with grit will model it by not giving up or reducing her expectations. She will push through challenges and keep working until the task is completed, she will not give up on her students or on her academic goals.

Question Four: What actions should an administrator display the attitudes, behaviors and academic competence related to your definition of grit?

Responses from the Traditional High School

Teacher T1: Teacher T1 stated that administrators should have high standards for all students and teachers. She said,

> Administrators should hold everyone to high standards while at the same time understanding that growth requires making mistakes and learning from them. Grit and growth mindset are intertwined and they are messy. Teachers need to feel safe taking risks and there needs to be structures in place to support growth. Likewise, when it comes to discipline of students, the underlying philosophy should be one of growth and learning. Students will make mistakes and there should be consequences, but the addition of an opportunity to restore oneself, restorative justice, for example, sends the message to students that they are capable of more.

Teacher T2: Teacher T2 emphasized the community aspect of schools. She stated,

> In addition to modeling grit by working through school issues, administrators should support teachers and students as they work through the learning process. By allowing those in the school community to take risks and to experience failure as part of growth, administrators can build a stronger learning community with a growth mindset.

Teacher T3: Teacher T3 did not have much to express on this topic, but did emphasize modeling. “Modeling it for staff and students and showing a pleasant attitude while working.”

Teacher T4: Teacher T4 shared her thoughts on schools including a need to change the emphasis traditionally found in schools. She stated,

> I would like administrators to value grit over grades, to praise effort, to see growth as important as test scores. I appreciate it when administrators allow teachers to try something new. It takes a lot grit to try new things and even more to continue and improve them.

Teacher T5: This teacher felt that students should learn from their mistakes as a part of the school process. Specifically, she said,

> Understanding behavioral choices that students make are a part of their learning. Assisting students to have the mindset that they “belong in that academic environment” and that mistakes are part of learning” would be important ideas to ensure student embrace.

Teacher T6: Teacher T6 felt that grit began with an administrator setting, and keeping, specific standards. He said, “An administrator would show grit the same way a teacher would by not accepting anything less than a person’s (students, teachers, and themselves) 100% effort and behavior.”

Teacher T7: Teacher T7 did not share much on this topic. However, did offer, “Administrators should model expectations and inspect what they expect.”

Teacher T8: Teacher T8 felt that grit needed to begin with the administrators in order for others to have grit. Specifically, she said, “Administrators must have grit. They

must have the ability to lead with courage and have their followers believe. It is important because people don't believe in second guessers. They must be strong minded individuals."

Teacher T9: Teacher T9 echoed the thoughts of T8 when he stated, "Administrators should model behaviors and hold their teachers to high expectations creating opportunities for growth and development."

Teacher T10: Teacher T10 briefly commented that administrators were similar to teachers in modeling grit. Specifically, "The attitudes, behaviors, and academic competence should be displayed as a teacher would and displayed a professional and more assertive role."

Responses from Non-traditional Technical High School

Teacher NT1: Teacher NT1 felt that administrators should have a certain presence in their buildings daily. She said,

> Attitudes of administrators should be optimistic and positive in general. Behaviors of administrators, with respect to grit, should be: Prompt and consistent adjudication of discipline issues, A frequent and consistent physical presence throughout the school day in high traffic areas during high traffic times.

She followed up by saying that there was a need to move beyond reacting to events. She said, "To be proactive, to be an excellent communicator and mediator and thoughtful, rational and calculated. Academic competence should be displayed by having a mastery of school board policies as well as working knowledge of the student and faculty climate."

Teacher NT2: Teacher NT2 was very willing to speak about this particular topic. She specifically felt that administrators should create a vision for their school. She stated,

> Administrators create the visions and goals for the entire school. While each teacher will have their specific area they focus on, every school should have over riding goals they want to see every student achieve. The building goals should also include staff growth and fulfillment, community involvement, and other aspects that will help the primary goals of student success.

To go even further, administrators needed to recognize their students and staff and the work they were doing. She stated,

> Administrators should help staff and students link school and class goals to their personal goals. For students this means helping them see past what is currently going on and understand how their actions today affect who they become and what they want to accomplish. For teachers it means helping them remember what got them into teaching in the first place and how their impact affects students for years to come. Teachers sometimes need to hear administrators recognize that even though the desired success does not always come out in a test score and some of the biggest victories are teaching students soft skills or just showing compassion for them.

She closed by saying that even though administrators might not receive much positive feedback, they needed to show grit in their daily work. Specifically she said,

> The administrator must show grit everyday by maintaining a positive attitude being fair in handling all staff and students issues and being there to support the staff in any way they can. Administrators get very little appreciation for what they

> do, so their grit has to come from within. Since they deal with so many negative situations with students, teachers, and parents it is important for them to remember why they are there and focus on the good they are doing, even in a bad situation.

Teacher NT3: Teacher NT3 stressed being positive as key when she said, "An administrator should also have a positive attitude and give encouragement to students and staff letting them know they are believed in and that they are able to accomplish their goals."

Teacher NT4: The concept of openness ran through the comment of teacher NT4 who stated, "Administrators should display an open ear, open eye, open mouth and an open heart. They will either set the pace or break the rhythm."

Teacher NT5: Teacher NT5 stressed professionalism as the key to maintaining a positive work environment. She said,

> For administrators, being able to multi-task and solve problems in a manner that is professional is very important. Administrators need to work hard to maintain calm and professionalism in the helter-skelter that is sometimes related to working with young adults.

Teacher NT6: Teacher NT6 thought it was important for administrators to feel they would make a positive change in their school. He stated,

> Administrators must possess the belief that, not only I can make 'change' but I will make 'change.' In the idea of grit, administrators must provide the support that both teachers and students need to begin that change. Administrators should consistently be in search of new ways to make the educational system fairer for all

> students. Knowing that will be an easy task, administrators must be tenacious in this effort and keep steady to complete that task.

He closed with thoughts about working in socio-economically disadvantaged schools. He stated, "Administrators in lower economic districts will have a heartier task than their affluent counterparts and as long as this disparity exist; thus our educational system will continue to be flawed."

Teacher NT7: Teacher NT7 felt administrators should support their staff in creating a positive work environment. He said, "An administrator has all of the above attitudes coupled with the ability to watch over the learners and the teachers and to provide the supports necessary for creating the environment where scholarship happens."

Teacher NT8: Teacher NT8 thought that the key was to lead by example. She stated,

> Administrators should also have high grit and lead by example to help promote the student, teacher and administrator's relationship. When all three individuals buy in and develop a passionate grit towards the common goals to educate our youth then we all succeed.

Teacher NT9: Teacher NT9 thought that administrators should lead by example and model the expected behavior. He said,

> I feel like administrators should be willing to model what they seek to develop in their teachers. I feel like it is a learning system that flows from the top down eventually permeates our classroom and school community. For example, if a teacher has low-test scores, it may have nothing to do with the teacher's competence. Maybe they have just lost their passion, their grit. An administrator

could help the teacher develop a plan to help the teacher reach their educational goals for their students.

Teacher NT10: Teacher NT10 felt that tenaciousness was the key when she said, An administrator should model grit by seeing school-wide programs and initiatives through to the end regardless of the roadblocks that come up. An administrator should also support students and teachers in their pursuits. He or she will have high expectations for teachers and students and will make the resources available for both to accomplish goals.

Administration Responses: Non-traditional Technical High School and Traditional High School

The principals and assistant principals of each school were interviewed, as well. The non-traditional technical high school had one building principal, two assistant principal interns, and one assistant principal. The traditional high school had one building principal and four grade-level assistant principals. Each participating principal and assistant principal was interviewed with the following questions:

Describe your school in terms of population.

Principal #1: (traditional high school): "About 74% White, 18% Black, 2% Hispanic, 3% Multi-Raced."

Principal #2: (non-traditional technical high school): "Our student population varies. We have about 3% Asian, 82% Black, 3% Hispanic and 15% White."

Assistant Principal Intern #1: (non-traditional technical high school): "Technical High School is a school populous mainly composed of African-American

students with about 10% of this population being Caucasian such as Hispanic or Asian. There are many more females that attend versus male students."

Assistant Principal Intern #2: (non-traditional technical high school): "Our population is of mixed races, black, Asian, Hispanic and white. The students come from middle class families to families that struggle with poverty issues."

Assistant Principal #3: (traditional high school): "We have a mixed population."

Assistant Principal #4: (traditional high school): "We have a mixed population of African-American, Caucasian, Hispanic, Asian and Multi-racial students."

Assistant Principal #5: (traditional high school): "We have a mixed student population."

Assistant Principal #6: (traditional high school): "We have a mixed population with majority of our students being of European descent."

What types of students attend your non-traditional high school/traditional high school?

Principal #1: (traditional high school) "All types."

Principal #2: (non-traditional technical high school): "Our students come from various backgrounds from middle class to underprivileged. Many of our students attend tech because they know that college is not affordable for their families, so they would like to learn a trade."

Assistant Principal Intern #1: (non-traditional technical high school):

Students that like to work with their hands as well as highly motivated to be in the working world soon after high school. Additionally, students that want to attend a

post-secondary college enjoy having that and it will allow them to skip over coursework and complete work sooner.

Assistant Principal Intern #2: (non-traditional technical high school): "Students who are interested in pursuing a career in one of the technical shops offered at Technical High School. We have a mixed of full day and half day students."

Assistant Principal #3: (traditional high school): "Middle class families to families that are well off."

Assistant Principal #4: (traditional high school): "We service all types of students. We have students that come from middle class families and students that come from well off families. We also service students that come from different school districts."

Assistant Principal #5: (traditional high school): "We have all types of students."

Assistant Principal #6: (traditional high school): "We have all types of students here. We are a neighborhood high school. Many of our students walk or drive to school. Our students come from various backgrounds."

How would you define grit?

Principal #1: (traditional high school): "Hard work, dedication, resolve to do the best possible in all situations."

Principal #2: (non-traditional technical high school): "Grit is one's motivation and dedication to perform a task successfully."

Assistant Principal Intern #1: (non-traditional technical high school): "Grit is the determination a person has to complete and overcome situations. Grit allows a person to continually maneuver over hurdles without giving up."

Assistant Principal Intern #2: (non-traditional technical high school): “I would define grit as the determination and ability to preserve during difficult time.”

Assistant Principal #3: (traditional high school): “Grit is a student’s determination and motivation to succeed at a specific task. Whether it be related to school or extra-curricular activities.”

Assistant Principal #4: (traditional high school): “A student’s motivation to succeed at a certain task.”

Assistant Principal #5: (traditional high school): “I would define grit as a student’s motivation and determination for success.”

Assistant Principal #6: (traditional high school): “A student’s motivation to be successful in their endeavor(s). They would work hard and be focused on what the success is.”

How do you perceive the factors of long-term success among male and female students?

Principal #1: (traditional high school): “I think each individual student is different. I cannot say this is because of gender but instead the individual person.”

Principal #2: (non-traditional technical high school):

> Each student is different and learns differently. Success among male and female students is based upon their own motivation and dedication to perform their academic tasks. I perceive long term success among male and female students as a choice that they personally make to work hard and dedicate themselves to their education.

Assistant Principal Intern #1: (non-traditional technical high school):

Each student is different. Both males and females have the potential and ability to have solvent careers and success. For either gender to be successful, both must possess desire, great work ethic, and a realistic plan of how to achieve their goals.

Assistant Principal Intern #2: (non-traditional technical high school):

Long term success for both male and female students starts with completing high school and receiving a diploma. A strong sense of self-determination is also a factor in long- term success. Female students need a bit more self-advocacy skills than male students especially if entering a male dominated field.

Assistant Principal #3: (traditional high school): "This is tough because every person is different and have various levels of motivation. Long term success for both male students and female students is based upon how gritty they are to get to the success."

Assistant Principal #4: (traditional high school):

Long term success for males and females is determined by them. Students are responsible for their own learning, determination, and motivation to perform and become successful at a certain tasks. Everyone is different and have different learning processes and different goals to get there.

Assistant Principal #5: (traditional high school):

I perceive males and females as being different in their own learning. Everyone is different and learns differently. Their motivation and determination lies differently depending upon how gritty they are and what they want to achieve in the long run.

Assistant Principal #6: (traditional high school): “Everyone is different and their levels of grit are different. This is a tough question. This is determined by the individual person, whether they are male or female.”

How would you describe a traditional high school and a non-traditional technical school?

Principal #1: (traditional high school): “Four year high school will focus on different aspects throughout the day. The Tech school will focus on a specific skill and provide a certified skill for the student to take with them.”

Principal #2: (non-traditional technical high school):

A traditional high school, in my opinion, focuses on students acquiring a high school diploma which will then lead them to acceptance into a college or university. A technical school provides students with the academic and technical piece. Students at a technical high school not only are provided with an opportunity to earn a high school diploma but also a certificate and/or license in an area of trade.

Assistant Principal Intern #1: (non-traditional technical high school):

A traditional high school is focused more on academic success. At a technical high school, the focus leans more towards the career and technical components. At a technical high school, the greater emphasis is on how your academic success can help your career.

Assistant Principal Intern #2: (non-traditional technical high school): “A traditional high school predominantly prepares students for college. A technical school prepares students for college, trade school or work.”

Assistant Principal #3: (traditional high school): “Students at a technical high school have opportunities to learn a trade. A traditional high school student does not have that opportunity.”

Assistant Principal #4: (traditional high school):

> A traditional high school affords students the opportunity to earn a high school diploma at the end of their four years. A technical high school affords students an opportunity to earn a certificate in a chosen trade as well as their high school diploma.

Assistant Principal #5: (traditional high school): “A technical high school allows students to learn a trade and receive a certification in a chosen area, whereas a traditional high school student earns a diploma without the trade.”

Assistant Principal #6: (traditional high school):

> A traditional high school student goes through their four year program and if successful, earns a diploma at the end of the fourth year. A technical high school student learns a trade and will graduate with a certificate in that trade that they chose and a four year high school diploma.

What are your additional thoughts?

Principal #1: (traditional high school): “Grit is a key factor in success in all aspects of a student/person’s life.”

Principal #2: (non-traditional technical high school): “Grit is an aspect of character that one would have to learn when their motivation and determination is so strong that success their key factor.”

Assistant Principal Intern #1: (non-traditional technical high school):

Most students in the 21st century lack grit. I do believe that grit can be taught to students that see the benefits of grit. High school students are quick to give up if something is difficult or takes more effort than originally planned. Many high school students like the immediacy of rewards and do not want to work too hard to be the victor.

Assistant Principal Intern #2: (traditional high school): There are no comments to report.

Assistant Principal #3: (traditional high school): There are no comments to report.

Assistant Principal #4: (traditional high school): There are no comments to report.

Assistant Principal #5: (traditional high school): There are no comments to report.

Assistant Principal #6: (traditional high school): There are no comments to report.

Overall Student Responses to The Grit-Survey

Table 1 displays the overall response to Grit-Survey Question 1. In responding to 'New ideas and projects sometimes distract me from previous ones,' the population answered 34.75% with 'somewhat like me.' The smallest response, 11.59% answered 'very much like me'.

Table 1

Grit-Survey Question 1

Q1: New ideas and projects sometimes distract me from previous ones.

Answer Choices	**Responses**
Very Much Like Me (1)	11.59% 24
Mostly Like Me (2)	17.39% 36
Somewhat Like Me (3)	35.75% 74
Not Much Like Me (4)	20.29% 42
Not Like Me At All (5)	14.98% 31

Minimum	Maximum	Median	Mean	Standard Deviation
1.00	5.00	3.00	3.10	1.20

Table 2 displays the overall response to Grit-Survey Question 2. In responding to 'Setbacks (delays and obstacles) don't discourage me. I bounce back from disappointments faster than most,' the population answered 30.29% with 'very much like me.' The smallest response, 6.73% answered 'not like me at all.'

Table 2

Grit-Survey Question 2

Q2: Setbacks (delays and obstacles) don't discourage me. I bounce back from disappoints faster than most.

Answer Choices	**Responses**
Very Much Like Me	30.29% 63
Mostly Like Me	28.37% 59
Somewhat Like Me	21.15% 44
Not Much Like Me	13.46% 28
Not Like Me At All	6.73% 14

Table 3 displays overall responses to Grit-Survey Question 3. In responding to 'I have been obsessed with a certain idea or project for a short time but later lost interest,' the population answered 31.4% with 'somewhat like me.' The smallest response, 9.66% answered 'very much like me.'

Table 3

Grit Survey Question 3

Q3: I have been obsessed with a certain idea or project for a short time but later lost interest.

Answer Choices	Responses
Very Much Like Me	9.66% 20
Mostly Like Me	19.32% 40
Somewhat Like Me	31.40% 65
Not Much Like Me	21.74% 45
Not Like Me At All	17.87% 37

Table 4 displays the overall response to Grit-Survey Question 4. In responding to 'I am a hard worker,' the population answered 59.62% with 'very much like me.' The smallest response, .48% answered 'not like me at all.'

Table 4

Grit-Survey Question 4

Q4: I am a hard worker.

Answer Choices	**Responses**
Very Much Like Me	59.62% 124
Mostly Like Me	26.44% 55
Somewhat Like Me	12.02% 25
Not Much Like Me	1.44% 3
Not Like Me At All	0.48% 1

Table 5 displays the overall response to Grit-Survey Question 5. In responding to ‘I often set a goal but later choose to pursue (follow) a different one,’ the population answered 35.58% with 'not much like me.’ The smallest response, 5.77% answered ‘very much like me.’

Table 5

Grit-Survey Question 5

Q5: I often set a goal but later choose to purse (follow) a different one.

Answer Choices	**Responses**
Very Much Like Me	5.77% 12
Mostly Like Me	12.98% 27
Somewhat Like Me	32.21% 67
Not Much Like Me	35.58% 74
Not Like Me At All	13.46% 281

Table 6 displays the overall response to Grit-Survey Question 6. In responding to 'I have difficulty maintaining (keeping) my focus on projects that take more than a few months to complete,' the population answered 26.92% with 'somewhat like me' and 26.92% 'not much like me.' The smallest response, 9.13% answered 'very much like me.'

Table 6

Grit-Survey Question 6

Q6: I have difficulty maintaining (keeping) my focus on projects that take more than a few months to complete.

Answer Choices	**Responses**
Very Much Like Me	9.13% 19
Mostly Like Me	17.79% 37
Somewhat Like Me	26.92% 56
Not Much Like Me	26.92% 56
Not Like Me At All	19.23%

Table 7 displays the overall response to Grit-Survey Question 7. In responding to 'I finish whatever I begin,' the population answered 44.71% with 'very much like me.' The smallest response, .48% answered 'not like me at all.'

Table 7

Grit-Survey Question 7

Q7: I finish whatever I begin.

Answer Choices	Responses
Very Much Like Me	44.71% 93
Mostly Like Me	31.73% 66
Somewhat Like Me	19.71% 41
Not Much Like Me	3.37% 76
Not Like Me At All	.48% 1

Table 8 displays the overall Grit-Survey Question 8. In responding to 'I am diligent (hardworking and careful),' the population answered 56.80% with ''very much like me.' The smallest response, .49% answered 'not like me at all.'

Table 8

Grit-Survey Question 8

Q8: I am diligent (hardworking and careful).

Answer Choices	Responses
Very Much Like Me	56.80% 117
Mostly Like Me	31.55% 65
Somewhat Like Me	9.71% 20
Not Much Like Me	1.46% 3
Not Like Me At All	.49% 1

Grit-Survey Questions Comparison

Table 9 displays a comparison overall responses to Grit Survey Question 1. In responding 64% of the population from the non-traditional high school answered ‘very much like me.’ The smallest response, 14% from the traditional high school answered ‘very much like me.’

Table 9

Grit-Survey Question 1: Percentages

	Very Much Like Me	Mostly Like Me	Somewhat Like Me	Not Much Like Me	Not Like Me
NTHS	64%	0%	18%	9%	9%
THS	14%	14%	57%	10%	14%

Table 10 displays a comparison overall responses to Grit Survey Question 2. In responding 51% of the population from the non-traditional high school answered ‘very much like me.’ The smallest response, 12% from the traditional high school answered ‘very much like me.’

Table 10

Grit-Survey Question 2: Percentages

	Very Much Like Me	Mostly Like Me	Somewhat Like Me	Not Much Like Me	Not Like Me
NTHS	51%	25%	11%	7%	6%
THS	12%	36%	31%	19%	2%

Table 11 displays a comparison overall responses to Grit Survey Question 3. In responding 10% of the population from the non-traditional high school answered ‘very

much like me.' The smallest response, 7% from the traditional high school answered 'very much like me.'

Table 11

Grit-Survey Question 3: Percentages

	Very Much Like Me	Mostly Like Me	Somewhat Like Me	Not Much Like Me	Not Like Me
NTHS	10%	18%	32%	23%	17%
THS	7%	23%	34%	24%	12%

Table 12 displays a comparison overall responses to Grit Survey Question 4. In responding 82% of the population from the non-traditional high school answered 'very much like me.' The smallest response, 44% from the traditional high school answered 'very much like me.'

Table 12

Grit-Survey Question 4: Percentages

	Very Much Like Me	Mostly Like Me	Somewhat Like Me	Not Much Like Me	Not Like Me
NTHS	82%	14%	2%	1%	1%
THS	44%	38%	16%	2%	0%

Table 13 displays a comparison overall responses to Grit Survey Question 5. In responding 6% of the population from the non-traditional high school answered 'very much like me.' The smallest response, 2% from the traditional high school answered 'very much like me.'

Table 13

Grit-Survey Question 5: Percentages

	Very Much Like Me	Mostly Like Me	Somewhat Like Me	Not Much Like Me	Not Like Me
NTHS	6%	17%	24%	38%	15%
THS	2%	13%	40%	38%	7%

Table 14 displays a comparison overall responses to Grit Survey Question 6. In responding 10% of the population from the traditional high school answered ‘very much like me.’ The smallest response, 8% from the non-traditional high school answered ‘very much like me.’

Table 14

Grit-Survey Question 6: Percentages

	Very Much Like Me	Mostly Like Me	Somewhat Like Me	Not Much Like Me	Not Like Me
NTHS	8%	15%	20%	25%	32%
THS	10%	23%	29%	34%	4%

Table 15 displays a comparison overall responses to Grit Survey Question 7. In responding 62% of the population from the non-traditional high school answered ‘very much like me.’ The smallest response, 26% from the traditional high school answered ‘very much like me.’

Table 15

Grit-Survey Question 7: Percentages

	Very Much Like Me	Mostly Like Me	Somewhat Like Me	Not Much Like Me	Not Like Me
NTHS	62%	24%	11%	2%	1%
THS	26%	45%	24%	5%	0%

Table 16 displays a comparison overall responses to Grit Survey Question 8. In responding 79% of the population from the non-traditional high school answered ‘very much like me.’ The smallest response, 38% from the traditional high school answered ‘very much like me.’

Table 16

Grit-Survey Question 8: Percentages

	Very Much Like Me	Mostly Like Me	Somewhat Like Me	Not Much Like Me	Not Like Me
NTHS	79%	18%	3%	0%	0%
THS	38%	44%	13%	3%	2%

The responses from the 200 eight-item Grit-S surveys were tabulated. There were 100 participants who completed the Grit-S survey from each of the two high schools. The responses were then evaluated using a *z*-test for difference of means (Table 17).

Table 17

z-Test for Difference in Means: Comparison of Non-Traditional to Traditional

	Mean	Variance	*z*-test value	Significance
Q1: New ideas and projects sometimes distract me from previous ones.				
Non-Traditional Technical	119	6179	0.277	none
Traditional High School	218	35134		
Q2: Setbacks (delays and obstacles) discourage me. I bounce back from disappointments faster than most.				
Non-Traditional Technical	102	1003	0.3917	none
Traditional High School	157	13827		
Q3: I have been obsessed with a certain idea or project for a short time but later last interest				
Non-Traditional Technical	232	26753	0.066	none
Traditional High School	217	20484		
Q4: I am a hard worker.				
Non-Traditional Technical	39	661	0.857	none
Traditional High School	74	3825		
Q5: I often set a goal but later choose to pursue (follow) a different one.				
Non-Traditional Technical	254	47500	0.029	none
Traditional High School	239	49207		
Q6: I have difficulty maintaining (keeping) my focus on projects that take more than a few months.				
Non-Traditional Technical	289	83345	0.227	none
Traditional High School	201	35962		
Q7: I finish whatever I begin				
Non-Traditional Technical	62	958	0.504	none
Traditional High School	100	7146		
Q8: I am diligent (hardworking and careful).				
Non-Traditional Technical	35	1163	1.587	none
Traditional High School	85	2821		

Note: n = 100 for each sample. *z*-critical = 1.96.

Even though there were observable differences in the responses, there were no statistically significant differences. Only the responses to Question 8 approached the threshold of 1.96. However, at 1.587 it clearly was not significant.

Summary

The eight-item Grit-Survey, a more efficient measure of grit identified items for the Short Grit-Scale (Grit-S) with the best overall predictive validity across four samples originally presented in Duckworth et al. (2007) was utilized in this study. Data collected were scrubbed of identifying information. Students completed the survey on computers in a computer lab located on the campus of their home high school. One hundred randomly selected students from each identified high school completed the survey via Survey Monkey. Results were analyzed and descriptive statistics were first examined to understand the students' Grit-Scores and gender.

Results indicated that 64% of students at Technical High School were distracted by new ideas and projects; whereas 14% of the students participating from Traditional High School were not distracted by new ideas and projects. Analyzed results indicated that 82% of the students participating in the survey from the Technical High School identified themselves as being a hard worker; whereas 44% of the students participating in the survey from Traditional High School identified themselves as being a hard worker.

Chapter Five: Discussion and Reflection

Introduction

In Chapter Five, an analysis and interpretation of the quantitative data from the student Grit-S survey and the qualitative data from the teacher interviews is presented. First the analysis of the student data is discussed, followed by discussion of the data from the teacher and administrator interviews. Suggestions for the two high school sites are given. Finally recommendations for future research are shared.

Interpretation of the Data

The purpose of this study was to explore a possible difference in the level of grit, as defined by Duckworth and Quinn (2009), among students who attended a non-traditional technical school and those who attended a traditional high school. The researcher was unable to find previous studies that measured a possible difference in the levels of grit between students who attended these two types of educational institutions. Most research comparing traditional and nontraditional high schools focused on academic outcomes, such as attendance, GPA, drop-out rate, transcripts credits, and graduation rates (Kazis, 2005). While grit was not observed directly, students reported their own perceptions by responding to prompts on the validated Grit-S scale. The researcher gained the perspectives of educators, principals and teachers, on the concept of grit by using interviews as the data gathering tool.

Duckworth et al. (2007) defined grit as perseverance and passion for long-term goals that predicted effectiveness, largely unrelated to talent. Grit provided incremental predictive validity for achievement outcomes, particularly in settings of high challenge (Duckworth et al., 2007). A prior study found that students who received a technical

education were less-motivated and more at risk of dropping out of high school (Kazis, 2005). Proponents of CTE viewed CTE programs as an important part of the high school environment and a valuable source of attachment, motivation, and learning, especially for non-college-bound students (Arum, 1998; Castellano et al., 2003; Rosenbaum, 2001).

In 2007, Duckworth et al. identified a two-factor structure for the original 12-item, self-report measure of grit (Grit-O). The structure was consistent with the theory of grit as a compound trait comprising stamina in dimensions of interest and effort (Duckworth & Quinn, 2009). Further investigation to validate a more efficient measure of grit identified items for the Short Grit-Scale (Grit-S), with the best overall predictive validity across four samples originally presented in Duckworth et al. (2007). The Grit-S, utilized for the purpose of this study, was both shorter and noted by Duckworth and Quinn (2009) to be psychologically stronger than the 12-item Grit-Scale. The reduction of items from the Grit-O to the Grit-S did not come at the expense of predictive validity (Duckworth & Quinn, 2009). Given its superior psychometric properties, comparable predictive validity, and fewer items relative to the Grit-O, Duckworth and Quinn (2009) recommended the Grit-S as an economical measure of perseverance and passion for long-term goals, which suited the purposes of this research study.

The researcher believed there would be a possible difference in the levels of grit the two populations of students accessed for this study. Students attending the non-traditional technical high school worked towards earning a certification in a specified area of interest, in a goal driven learning environment where students “have an interest in and effort toward very long-term goals” (Duckworth et al., 2007, para.1). Students were encouraged to attend a college or university; however, they had an opportunity to earn

certification in their chosen field. Students who attended the traditional high school participated in the traditional high school program without having an opportunity to earn a certification in a specified area of interest. Based on the researcher's experience as an educational administrator within both learning environments, the researcher hypothesized that a student who attended a non-traditional technical high school would have a higher grit level, due to the focus on earning a career certification that could possibly earn a future career salary, immediately upon graduation.

A 2003 report of the Advisory Committee for the National Assessment of Vocational Education suggested that combining academic courses with CTE courses could be a powerful experience for students, keeping them attached to school and motivating them to complete their diplomas (as cited in Plank et al., 2008). A non-traditional technical high school featured different learning styles and interests, because the programs had direct connections with academic skills in classrooms exhibiting real-life workplace activities. With regard to long-term goals and endurance, Duckworth et al. (2007) wrote, "Achievement is the product of talent and effort, the latter a function of the intensity, direction, and duration of one's exertions towards a long term goal" (para. 114).

Research Questions and Hypothesis

RQ1: How do secondary educators and principals in a traditional high school setting perceive grit among their students?

RQ2: How do secondary technical school educators and principals perceive grit among their students?

H1: There will be a difference in the level of grit among students who attend a non-traditional technical school and students who attend a traditional high school, as measured by the Grit-S Survey.

Research Overview

This research may add to the existing body of literature and investigated a possible difference in grit among students within two unique learning environments. The researcher based the study on quantitative and qualitative data obtained from each high school. The researcher obtained data for this from the Student Information System utilized at both high schools. The requested data was de-identified before received by the researcher. The researcher collected responses on the Grit-S survey through a web-based survey program, Survey Monkey. The researcher invited 100 high school students at both high schools to take the survey. Students under the age of 18 were given parental consent forms asked to have the forms back within a two-week period. Students 18-years-and-older were given consent forms and asked to have the forms returned within a two-week period. Students at the non-traditional technical high school were reminded via morning announcements after one week. An assigned administrator reminded students at the traditional high school to return their permission forms.

Data were gathered using the wording of questions and directions of the survey validated by Duckworth and Quinn (2009). The Grit-S survey was found to hold appropriate levels of psychometric properties (Duckworth & Quinn, 2009). Evidence of its constructs and predictive validity and internal consistency ranged from 0.73 to 0.83, computed across four different samples (Duckworth & Quinn, 2009). Medium to strong predictive validity, with unstandardized regression coefficients associated with Grit

scores, predicted student performance ranging from 0.22 to 0.55, with an associated odds ratio ranging from 0.80 to 1.73 (Duckworth & Quinn, 2009).

Individual responses to each of the 8-item Grit-S survey questions were obtained from each high school via a web-based program, Survey Monkey. Each response was tabulated based on a five-point Likert scale and recalculated to the appropriate point value determined by Duckworth and Quinn (2009). The point value of the Grit-S survey was computed as the scaled responses were totaled and divided by eight, to calculate the average Grit-Score for each student in the sample. Results fluctuated depending on the question, as analyzed results indicated that 82% of the students participating in the survey from the Technical High School identified themselves as being hard workers; whereas 44% of the students participating in the survey from the Traditional High School identified themselves as being hard workers.

Grit-S Analysis

There were limits to the existing research on grit (Strayhorn, 2014). Only a few studies examined the role of grit in predicting academic success among students (Duckworth & Quinn, 2009; Rojas et al., 2012), and no studies tested the ability of grit to add incremental validity to predicting academic success for students attending a Technical High School as compared to those attending a Traditional High School. Grit research focused on the following three areas: (a) initial development of a Grit-Scale, (b) theoretical mining of the concept to clarify its meaning and distinction from other personality traits and (c) tests of its predictive validity for specific samples (Duckworth et al., 2007). This study had the following objectives:

1) Identify students attending a non-traditional technical high school.

2) Identify students attending a traditional high school.
3) Attain participation from students at each high school to complete the Grit-Survey.
4) Identify which students were grittier.

The results of this study indicated that, while both sets of students showed grit in various areas according to the eight-item Grit-Survey, there was no statistically significant difference between the students from the two high schools. However, the observable results of the Grit-S survey showed students from the non-traditional technical high school exhibited more grit than the students at the traditional high school.

Interview Analysis

The interviews were conducted face-to-face, with one exception. One administrator provided his responses electronically. The researcher transcribed the interviews and qualitatively coded the results. There were three common themes that emerged with regard to grit in both students and adults.

The first of these themes was in the definition of grit. Teachers and administrators from both high schools identified grit as a student's motivation and determination while focusing on a specific task. Examples of this type of definition included the response from teacher T6 who stated, "Students would display grit with a 'can do' attitude, a fight to understand instead of giving up." Additionally, teacher NT2 stated, "Grit is an individual's persistence on a given assignment. This individual never gives up and continues to strive for success." Administrators echoed this same belief. Administrator #2 said simply, "Grit is one's motivation and dedication to perform a task successfully."

A second theme that emerged was that adults in the school setting had to model grit for students to increase students' levels of grit. Teacher T2 felt that this modeling was vital. She stated, "I think that teachers have to practice what they preach. Teachers, like students, need to try new things in class. This means that failure, or a bad lesson are part of the teaching process." Teacher NT9 sought to model behavior for his students. He said, "We use the phrase in class 'My best for your best.' We talk about smart goals. We talk about our preparation for our TSA. Teachers who have grit develop classroom cultures rooted in grittiness." Several of the teachers felt it was also important for the administrators to also emphasize and model grit in their daily practice. Teacher NT10 stated, "An administrator should model grit by seeing school-wide programs and initiatives through to the end regardless of the roadblocks that come up. An administrator should also support students and teachers in their pursuits."

A third theme emerged from the administrative interviews. Administrators from both schools spoke about there being no difference between the genders when it came to success. Principal #2 from the non-traditional high school stated,

> Success among male and female students is based upon their own motivation and dedication to perform their academic tasks. I perceive long term success among male and female students as a choice that they personally make to work hard and dedicate themselves to their education.

This thought was echoed by others. Among those was Assistant Principal #3 who stated, "This is tough because every person is different and have various levels of motivation. Long term success for both male students and female students is based upon how gritty they are to get to the success." It is important to note that not all of the administrators

viewed gender as a non-issue. Assistant Principal #5 said there was a difference between the genders. She stated,

> I perceive males and females as being different in their own learning. Everyone is different and learns differently. Their motivation and determination lies differently depending upon how gritty they are and what they want to achieve in the long run.

Personal Reflections

As I reflect on the research that I completed on this topic of grit, coined by Duckworth and Quinn (2009), I could not help but to want to continue this research on a more in-depth level, reaching out to all technical highs schools in Missouri. Grit, defined as the tendency to pursue long-term goals with sustained zeal and hard work, was shown to predict achievement in academic, vocational, and a-vocational domains (Duckworth et al., 2007; Duckworth & Quinn, 2009; Duckworth et al., 2009). My thoughts were: to determine grit in each student one must have conversations with the students and track their academic careers from kindergarten through 12th grade. Research conducted by Duckworth and colleagues was relevant to this topic and was systematically read and analyzed in order to gain understanding of the research phenomenon of grit.

Reflecting on the experiences of this dissertation, I realized that I reflected much on my own educational journey and could not help but to question my own personal grit as a high school student. Like many, some of my most memorable experiences come from my time in high school. My wonder is, would I have achieved more or less if I had the experiences of an non-traditional technical high school, and would I have gone on to become a college graduate? Concerning the entire process of this dissertation, it should

be noted that, overall, grit was a very intriguing topic to me. As an educational administrator, my interest lay in student success and achievement, as I found the definition and research of grit to trigger an interest, as I took on the challenge of researching in a new setting what Duckworth had formulated. All of the information that I read around the topic of grit was of great value and aligned with attempts to attain student achievement within students, at the time of this writing.

The interviewees represented various teachers who taught different subject areas with vastly different experiences within their classrooms. Though they may have shared the same ideas on how to define grit, the classroom experiences were different. The communication with the interviewees provided information that would have been a challenge to research merely from research articles and books. The information gained from the interviewees was informative and useful.

The most demanding and time-consuming requirement was preparation for students who participated in the Grit-Survey and the transcribing of all interviews. Since both schools were different in technology, preparing 100 students to participate in a computer-generated survey took more time than I anticipated. In interviewing teachers and administrators, I found no difficulty in provoking individuals to talk or answer the asked questions directly. The challenge was provoking them to go in-depth about the questions asked. Teachers answered the questions given and did not initiate more detail to what the questions asked about grit, as it related to students.

Recommendations for the Research Sites

This study provided a foundation for future research on grit, student performance and the non-traditional technical high school student within a broader technical

educationally-based school system, in comparison to the traditional high school student in the broader realm of secondary education. One difficult experience was randomly selecting students to participate in the Grit-S survey, as well as giving and receiving back parent and student consent forms. Although the survey took approximately five minutes to complete, it was evident that students on each campus used the survey participation as a means to get free time. Duckworth et al. (2007) defined grit as perseverance and passion for long-term goals. My recommendation for secondary school administrators is to provide students upon entering high school with an assessment to determine their level of grit. Grit comprised a suite of traits and behaviors, including goal-directedness (knowing where to go and how to get there), motivation (having a strong will to achieve identified goals), self-control (avoiding distractions and focusing on the task at- hand), positive mind-set (embracing challenge and viewing failure as a learning opportunity) (Goodwin & Miller, 2013). After incoming freshman have received their results from the grit assessment, they should be afforded an opportunity to track their success by not only creating self-directed goals, but also monitoring when and how each goal was met. Secondary school administrators, whether in a non–traditional technical high school that promotes career and college readiness or a traditional high school that promotes college readiness, should provide opportunities for students to gain assistance with long–term decision making, as it relates to their successes after high school. Though it was determined that a notable number of students from each campus stated that they were hard workers, the researcher questions if they knew and/or understood what it means to work hard towards a specific goal. Secondary administrators should plan and execute opportunities for students to gain an understanding of college and career readiness and

provided detailed information on ways to maneuver through and reach their self-directed goals. Students should be assessed not only academically, but should also be given a college and career assessment to determine or assist with determining where to go and how to get there in regard to their lives after high school. Discussions of technical education should be offered as a resource for students at traditional high school, as well. High school counselors should offer the option of technical education to students who are determined as technically oriented, per their assessment. The characteristics of grit, as mentioned throughout my study, could be a determining factor in student levels of success.

Recommendations for Future Research

No research study can gather its data from an unlimited number of subjects. This research was no exception. Future research should entail venturing out to more school districts that provide technical programs for students, as well as traditional high schools. Increasing the sample size would ideally shed some additional light on the topic. There are a variety of additional considerations that could be beneficial in future research. These additional topics are:

Though race was not a variable in this research, it was unknown if race played a role in determining a student's grit. Therefore, further research should dive into determining whether race was a determinant of grit. Also with academic performance, further research should consider a correlation between grit, student performance, report card grades, socioeconomic background, and standardized test scores. In evaluating how gritty a student is, their background and socioeconomic status may be important factors. According to a research report dated April 2014, which focused on grit, students who

came from high-poverty backgrounds faced greater challenges and had limited academic support. Further research into grit and poverty- stricken schools would develop an opportunity for researchers to tap into a students' abilities to show resilience when attempting to achieve long-term goals. According to Robertson-Kraft and Duckworth (2014), among novice teachers in low-income public schools, grittier teachers were more effective in the classroom and less likely to resign mid-year. A recommendation would be to provide a deeper understanding by researching what makes a teacher gritty and identifying immediate characteristics of the gritty and non-gritty teacher. A survey of teachers suggested that students displayed grit through their academic achievement. Although this study was comparing a non-traditional technical high school top a traditional high school, further research should dive into surveying a variety of teachers in various educational institutions; public schools, private schools, parochial schools, and Montessori schools on every level from elementary to high school, as it pertains to grit and student performance. Recommendations for researchers to dig into institutions of higher education, such as colleges and universities may be pertinent to compare the level of grit of students from a non-traditional technical college and students from a tradition college or university. Further, research should tap into whether gritty high school students move on to become gritty college students.

Suggestions for further research include the following: Since the sample of the study was limited, future studies could conduct interviews with students, more teachers and administrative staff, including district office administrators. This may provide the researcher with an in-depth understanding of the student thoughts first hand and lessen the limitations of the study. This may also provide the researcher with an opportunity to

explore specific mechanisms linking grit to student performance in both the non-traditional technical high school and the traditional high school.

The sample included students from one non-traditional technical high school and one traditional high school. Other studies could conduct surveys and interviews from a greater number of Missouri non-traditional technical high schools and a greater number of Missouri traditional high schools. Expanding the research population may provide the researcher with more information about various areas, as a comparison study. It may also provide a greater research base for comparison of demographics and other variables. Also, research could venture in a different direction and survey students from a non-traditional technical college and a traditional college or university. This may determine whether gritty students continue to possess their grit through college. Variables should include student performance on college entrance examinations, in remedial courses, and grades.

This dissertation was based only in Missouri. Future projects could compare differences in non-traditional technical high schools and traditional high schools in different geographic locations. Since curriculum varies from state-to-state, this may provide the researcher with more information to compare.

The research subjects in this study were almost all from suburban backgrounds. It was unknown at this point if students from a rural or urban background would perceive themselves differently than the students who actually participated in this study. This one variable is worthy of additional study as the school experience of students in various school settings could differ to a great or small degree. Without specific research to isolate this variable it is unknown how students would perceive themselves, with regard to grit.

Beyond the urban, suburban, and rural distinction, as a matter of geographical location, there are socio-economic factors that could be important in the level of grit a person possesses. It would be interesting to examine if students with different levels of affluence perceived situations differently. When faced with academic challenges or disappointments, do people of different socio-economic levels perceive those situations similarly?

Another variable worthy of consideration is grade point average (GPA). Future research that examines the previous academic success of a student, as indicated by their cumulative Grade Point Average, might well show a correlation between the previous level of academic success and the student's self-reported grittiness. If the student had a higher GPA, but had to work more hours than average outside of school on homework for example, they may have a higher level of grit. Conversely, students who were less successful academically may perhaps show a lower level of grit reflected in their lack of assignment completion.

Another dynamic worth further study is the possible correlation between parent or guardian career backgrounds and student's level of grit. Much like socio-economics, parental background is a variable that would remain outside of a student's control, yet could be related to grit in some way. Parental surveys or interviews could indicate how the adult viewed grit and could relate to the level of grit displayed in the students.

Race is an additional factor that merits consideration for future research. While there was some racial diversity in the subjects tested in this study, the race of the students was not examined specifically in seeking a relationship. This is not to be construed as a comparison of African American students to White students. Examining other races, such

as Asian or Hispanic would also be of merit. This particular variable might be one viewed as controversial. If one race or another was reported as more gritty, it could be perceived as an indictment of the less gritty races.

Since the level of grit can be determined in a student using a tool such as the Grit-S survey, other studies could research how educators might increase the grit level of a student. This may provoke conversations enabling educators to collaborate and create programs to increase student motivation and success. It is an important first step to identify a deficiency in a student. The identification of the level of grit certainly qualifies. However, the identification is merely a first step. Remediation of those who are found to be lacking in the area is the next key step. How this remediation would look, or what program would be most effective would be the worthwhile goal of this future study.

Though grit, tenacity, and perseverance are correlated, should these three variables be given priority and be integrated with curriculum and teacher development in determining the grit of a student? Through applicable research, one may answer this question by digging deeper into hiring qualified teachers and adopting a curriculum that provokes a student's grit level. Studies may use variables, such as teacher retention, teacher effectiveness, and teacher promotion. The researcher may use college GPA and college level courses completed while attending a college or university to determine the qualifications of a teacher.

Another variable when determining future research might be whether parental involvement is necessary to foster grit within students. Is coherence and agreement on objectives necessary in contributing to a student's grit? Shaver and Walls (1998) found that parents had a desire to be involved in the lives of their children regardless of their

economic status or ethnicity. Though parental involvement was beyond a student's control, future research on this subject may involve parents to take a survey to first determine their level of parental involvement and understanding of grit. After receiving survey results the researcher might then monitor the parental support progress and survey again to determine if their level of involvement had any correlation to their student's level of grit.

This dissertation used the Grit-S survey to determine a student's level of grit. The Grit-S was designed by selecting items that Duckworth and Quinn (2009) considered to have predictive validity and replication of the two-factor structure of the Grit-O across four different samples of children and adults (Duckworth & Quinn, 2009). While the 12-Item Grit-Survey proved valid and reliable, the researchers determined that they could improve upon and shorten the instrument (Duckworth & Quinn, 2009). Future research should be performed to determine how best to measure a student's grit and understand what methods of application are most effective when researching different educational settings.

Research should be considered to determine if a student's level of grit determines retention and promotion for high school students, whether they attend a non-traditional technical high school or a traditional high school. This could be accomplished by tracking a student's academic success through progress report grades and report card grades. This would allow the researcher to conduct a comparison of student-on-student grade performance, as it relates to retention and promotion. Other variables could be attendance and classes needed upon graduation.

Behavior in the classroom was found to predict later academic achievement (Alvidrez & Weinstein, 1999) and also important life outcomes in education and the labor market, even beyond the influence of achievement in standardized tests (Segal, 2013). Therefore, researching whether grit is a determinant or correlated with student behavior within a classroom setting should be considered for future research. This will allow for understanding if grit plays a role in developing good character within the classroom or self-motivated positive behavior in the classroom.

Since technology was a resource that students used daily, future research may look into whether technology is correlated with the level of grit a student may possess, as it pertains to academia. I-pads were being introduced to students as young as pre-school age. Does this source of integration with academic achievement have any indication on a student's grit level and performance within the classroom?

Conclusion

Towards the end of the data gathering and analysis it initially appeared that there might be some significant differences between the two high schools. However, statistical analysis confirmed there really was no difference in the grittiness of the two student populations. It is possible, and even likely, that an outsider viewing these two high schools might see them as very different in terms of population. However, in terms of grit, the students pursuing a technical education and those pursuing a traditional college preparatory education were similar in grit.

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Appendix A

8- Item Grit-Scale

Directions for taking the Grit-Scale: Please respond to the following 8 items. Be honest – there are no right or wrong answers!

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

Very much like me

Mostly like me

Somewhat like me

Not much like me

Not like me at all

2. Setbacks (delays and obstacles) don't discourage me. I bounce back from disappointments faster than most people.

Very much like me

Mostly like me

Somewhat like me

Not much like me

Not like me at all

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

Very much like me

Mostly like me

Somewhat like me

Not much like me

Not like me at all

4. I am a hard worker.

Very much like me

Mostly like me

Somewhat like me

Not much like me

Not like me at all

5. I often set a goal but later choose to pursue (follow) a different one. *

Very much like me

Mostly like me

Somewhat like me

Not much like me

Not like me at all

6. I have difficulty maintaining (keeping) my focus on projects that take more than a few months to complete. *

Very much like me

Mostly like me

Somewhat like me

Not much like me

Not like me at all

7. I finish whatever I begin.

Very much like me

Mostly like me

Somewhat like me

Not much like me

Not like me at all

8. I am diligent (hard working and careful).

Very much like me

Mostly like me

Somewhat like me

Not much like me

Not like me at all

Scoring:

1. For questions 2, 4, 7 and 8 assign the following points:
5 = Very much like me
4 = Mostly like me
3 = Somewhat like me
2 = Not much like me
1 = Not like me at all

2. For questions 1, 3, 5 and 6 assign the following points:
1 = Very much like me
2 = Mostly like me
3 = Somewhat like me
4 = Not much like me

5 = Not like me at all

Add up all the points and divide by 8. The maximum score on this scale is 5 (extremely gritty), and the lowest scale on this scale is 1 (not at all gritty).

Duckworth, A. L, & Quinn, P. D. (2009). Development and validation of the Short Grit-Scale
(GritS). Journal of Personality Assessment, 91, 166-174.
http://www.sas.upenn.edu/~duckwort/images/Duckworth%20and%20Quinn.pdf
Duckworth, A. L., Peterson, C., Matthews, M. D., & Kelly, D. R. (2007). Grit: Perseverance and
passion for long-term goals. Journal of Personality and Social Psychology, 9, 1087-1101.
http://www.sas.upenn.edu/~duckwort/images/Grit%20JPSP.pdf

Appendix B

Interview Questions for High School Principals (Technical School)

1. Describe your school in terms of population and demographics.

2. What types of students attend North Technical High School and what are the requirements for admission?
3. How would you define grit?

4. Do you perceive a difference in the factors of long -term success between male students and female students? If yes, please explain.

5. How would you describe a traditional high school and a technical high school?

6. What are your additional thoughts about grit and high school students?

Appendix C

Interview Questions for High School Principals

1. Describe your school in terms of population and demographics.

2. What types of students attend Kirkwood High School?

3. How would you define grit?

4. Do you perceive a difference in the factors of long- term success among male students and female students? If yes, please explain.

5. How would you describe a traditional high school and a technical school?

6. What are your additional thoughts about grit and high school students?

Appendix D

Interview Questions for Assistant Principals

1. Describe your school in terms of population and demographics.

2. What types of students attend Kirkwood High School/North Technical High School?

3. How would you define grit?

4. How do you perceive the factors of long -term success among male and female students?

5. How would you describe a traditional high school and a technical school?

6. What are your additional thoughts about grit and high school students?

Appendix E

Interview Questions for Teachers

1. How would you define grit?

2. How would you describe a student's specific attitudes, behaviors and academic competence related to your definition of grit in the previous question?

3. How should a teacher display the attitudes, behaviors and academic competence related to your definition of grit in the first question?

4. What actions should an administrator display the attitudes, behaviors and academic competence related to your definition of grit in the first question?

Appendix F

Lindenwood University
School of Education
209 S. Kingshighway
St. Charles, Missouri 63301

Informed Consent for Parents to Sign for
Student Participation in Research Activities

Grit and Student Performance: A Quantitative Comparative Analysis of a non-traditional technical school and a traditional high school.

Principal Investigator: Ronda Wallace, Ed.S
Telephone: 314-989-7600 E-mail: rw191@lindenwood.edu

Participant _____ Parent Contact info _____

Dear parent,

3. Your child is invited to participate in a research study conducted by Ronda Wallace, Ed.S under the guidance of Dr. John Long. The purpose of this research is to investigate a possible difference in the level of grit, as defined by Angela Duckworth, among students that attend a non-traditional technical school and those that attend a traditional high school. Grit is defined as an individual's level to persevere and a passion to achieve long-term goals (Duckworth, 2007).

2. a) Your child's participation will involve completing a brief 8 item measure of grit.

   b) The amount of time involved in your child's participation will be approximately 5-10 minutes during their Advisory period.

4. There are no anticipated risks to your child associated with this research.
5. There are no direct benefits for your child's participation in this study. However, your child's participation will contribute to the knowledge about the difference in the level of grit among students who attend a non-traditional technical school and students who attend a traditional high school.

6. Your child's participation is voluntary and you may choose not to let your child participate in this research study or to withdraw your consent for your child's participation at any time. Your child may choose not to answer any questions that he

or she does not want to answer. You and your child will NOT be penalized in any way should you choose not to let your child participate or to withdraw your child.

7. We will do everything we can to protect your child's privacy. As part of this effort, your child's identity will not be revealed in any publication or presentation that may result from this study.

8. If you have any questions or concerns regarding this study, or if any problems arise, you may call the Investigator, Ronda Wallace, Ed.S at 314-989-7600 or the Supervising Faculty,

Dr. John Long at 636-949-4756. You may also ask questions of or state concerns regarding your participation to the Lindenwood Institutional Review Board (IRB) through contacting Dr. Jann Weitzel, Vice President for Academic Affairs at 636-949-4846.

I have read this consent form and have been given the opportunity to ask questions. I will also be given a copy of this consent form for my records. I consent to my child's participation in the research described above.

Parent's/Guardian's Signature Date	Parent's/Guardian's Printed Name
Child's Printed Name	
Signature of Investigator Date	Investigator Printed Name

Revised 1-21-2010

Appendix G

Lindenwood University
School of Education
209 S. Kingshighway
St. Charles, Missouri 63301

Invitation for Student Participation in Research Activities

Grit and Student Performance: A Quantitative Comparative Analysis of a non-traditional technical school and a traditional high school.

Principal Investigator: Ronda Wallace, Ed.S
Telephone: 314-989-7600 E-mail: rw191@lindenwood.edu

Participant_____ Participant Contact info: _____

Dear Participant,

1. You are invited to participate in a research study conducted by Ronda Wallace, Ed.S under the guidance of Dr. John Long. The purpose of this research is to compare a possible difference in the level of grit, as defined by Angela Duckworth, among students that attend a non-traditional technical school and those that attend a traditional high school. Grit is defined as an individual's level to persevere and a passion to achieve long-term goals (Duckworth, 2007)**.**

2. a) Your participation will involve completing a brief 8 item measure of grit as described below.

b) The amount of time involved in your participation will be approximately 5 - 10 minutes during their Advisory period.

3. There are no anticipated risks to you associated with this research.

4. There are no direct benefits for your participation in this study. However, your participation will contribute to the knowledge about the difference in the level of grit among students who attend a non-traditional technical school and students who attend a traditional high school.

5. Your participation is voluntary and you may choose not to participate in this research study or to withdraw your consent for participation at any time. You may choose

not to answer any questions that you do not want to answer. You will NOT be penalized in any way should you choose not to participate.

6. We will do everything we can to protect your privacy. As part of this effort, your identity will not be revealed in any publication or presentation that may result from this study.

7. If you have any questions or concerns regarding this study, or if any problems arise, you may call the Investigator, Ronda Wallace, Ed.S at 314-989-7600 or the Supervising Faculty,
Dr. John Long at 636-949-4756. You may also ask questions of or state concerns regarding your participation to the Lindenwood Institutional Review Board (IRB) through contacting Dr. Jann Weitzel, Vice President for Academic Affairs at 636-949-4846.

I have read this consent form and have been given the opportunity to ask questions. I will also be given a copy of this consent form for my records. I consent to my participation in the research described above.

Participant's Signature Date Participant's Printed Name

_____

Signature of Investigator Date Investigator Printed Name

_____

Revised 10-07-2014