St. Francis Xavier University

A TEACHER'S AUTOETHNOGRAPHY OF GRIT AND STUDENT SUCCESS IN A HIGH SCHOOL PHYSICS CLASSROOM

By

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Dedication

This thesis is dedicated to both my mother and father, who are my true paragons of grit. My parents taught me the value of hard work, persistence and a never give up attitude. Without their endless support, love and belief in me, I would not have made it to this day.

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Abstract

What factors, situations and contexts lead to the success of students in school? Success can mean different things to different individuals and, therefore, success is context specific. Authors such as Duckworth, Peterson, Matthews and Kelly (2007) refer to success and achievement as the "accomplishment of widely valued goals" (p. 1087). These researchers suggest that highly accomplished students tend to have a high degree of grit. While much research related to grit focuses on personality traits such as determination, conscientiousness, sustained effort and the ability to persevere when encountering obstacles, other significant and sometimes overlooked factors also significantly impact a student's ability to be gritty and successful in schools.

Literature from Gorski (2016) suggests that grit ideology falls somewhere between two ends of a wide spectrum—deficit and structural ideology. For those who associate grit with deficit ideology, there is a belief that students can change their success and situation through a change in "attitudes, behaviors, cultures, and mindset" (p. 381). However, for those who associate grit with structural ideology, there is recognition of factors such as poverty, socioeconomic status, race, gender and inequity of school resources. Through an autoethnographic lens, the culture of grit and student success was researched and explored within a high school physics classroom. While deficit ideological traits exist in the autoethnographic stories involving former students, structural ideological factors also show crucial moments and times when a student's grit and success radically changed for the better or declined as a result.

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Chapter 1: Introduction

At twenty five years old, I began my full time teaching journey in 2009. Ever since I started teaching, I have always been fascinated by students who, day in and day out, make incredible strides towards success. I am often left with the question, "What factors, traits, qualities, life experiences or attitudes allow students to be so academically successful?" At the same time, "What situations, circumstances, and factors may possibly act as a hindrance for student success?" In working with professional learning communities (PLCs), I can only think of some potential reasons as to why students are not succeeding as well as they should: (1) Students do not have a foundation of support in place (e.g., school and family); (2) Some may lack study habits, effort or willingness to try; (3) Some are initially motivated but lose motivation with time; and (4) Some may initially be interested in a topic, but lose that interest with time.

During my Master of Education Degree in Leadership and Administration at St. Francis Xavier University, I encountered a concept called grit. Grit is defined as passion and perseverance for long-term goals (Duckworth, Peterson, Matthews & Kelly, 2007; Duckworth & Quinn, 2009). The concept of grit resonated with me because it provided many potential and reasonable explanations as to why some of my students were not succeeding. However, without formalized research, it would be hard to fully understand whether the phenomena of grit have an actual impact. With the concept of grit in mind and a burning need to learn why successful students are successful, I am left to begin my journey of discovery and understanding of such factors.

Situating the Story

Through the examination of grit, Duckworth et al. (2007), and Duckworth and Quinn (2009) demonstrated a whole host of variables that factor into the success of students. Such

factors include, but are not limited to, “creativity, vigor, emotional intelligence, charisma, self-confidence, emotional stability, physical attractiveness, and other positive qualities” (p. 1087). Duckworth describes very successful students as extremely gritty. Such students have a high-degree of determination, conscientiousness, resiliency, self-control, sustained effort and a strong ability to persevere when challenges arise. With these attributes in mind, whenever I reflect on my most successful students, all of them have traits synonymous with what Duckworth describes as gritty students. However, also taken at face value, some of my poorly performing students have traits opposite to gritty students.

It is important to acknowledge that Duckworth et al. (2007), and Duckworth and Quinn’s (2009) seminal research on grit provided me with not only the basis for further research into the phenomenon and culture of grit in my classroom but could possibly explain reasons as to why some of my students are incredibly successful while some are not. Duckworth et al., and Duckworth and Quinn expand on other research related to grit including Dweck, Chiu and Hong’s (1995) work on mindsets; the Big Five personality inventory, and intrinsic and extrinsic motivations from Ryan and Deci (2000). While Duckworth et al. (2007) and Duckworth and Quinn acknowledge other variables such as race, social inequities, and familial structures may impact grit, such factors are worthy of further research as they may likely impact an individual’s grit and success.

My Autobiographical Beginnings

My autobiographical beginnings start from the stories of my parents, who modeled for me what grit is. After the Fall of Saigon in 1975, both of my parents immigrated to Canada from the war-torn country of Vietnam. My father was an officer in the South Vietnamese navy. For much of his young adult life, he fought against the Communist North until all was lost in South

Vietnam. While my father had formalized schooling to be an officer in the South Vietnamese navy, my father once shared to me that he had dreams of being a lawyer; “If the war did not happen, I would not have been an engineer.” My mother had formalized schooling up until high school. After that point, upper education was impossible for her due to the conflict that occurred.

Both my parents did not know each other before moving to Canada. After all was lost in South Vietnam, many South Vietnamese people fled any way possible. Instead of being captured or killed by the North Vietnamese forces, he eventually fled to the Philippines, the United States and eventually arrived in Canada as a refugee. I often asked my father about the more intricate details of what happened during the war. However, he often avoids answering due to the trauma he faced. To that end, I avoided asking him any further questions because the firsthand account of death, pain and horrors inflicted on people is better left buried deep in his consciousness. As such, I only pieced out the story from what he revealed over my lifetime.

My mother also faced a very difficult, perilous and arduous journey fleeing Vietnam. When I was in my twenties, my parents showed me a film called *Journey from the Fall*. I recall my parents saying, “We cannot talk about what happened because it upsets us, but you can watch the movie with us and you can understand some of what we faced.” The movie, *Journey from the Fall* depicts a story of a South Vietnamese family fleeing Vietnam after the Fall of Saigon in 1975. The father in this movie was captured by the North Vietnamese army and placed in a prisoner of war re-education camp. In the movie, the mother faced horrific circumstances on the boat. This included starvation and raids from pirates to the fear of the boat capsizing due to the numerous people on a boat. I recall watching the movie with my parents. We had to stop the movie several times because the traumas of the past surfaced. Saying my parents faced a difficult journey would be an incredible understatement to what they faced.

Shortly after arriving in the early 1980s, my parents met each other in Nova Scotia, Canada. Settling in a new and foreign country was not easy for them. As refugees, there were many caring and supportive people who wanted to help Vietnamese refugees out. My parents once described the handouts that many people provided. But my parents were very proud people. They did not like accepting handouts and wanted to work hard and earn their way through society. My mother and father taught me the value of determination and hard work through this statement; "Always work hard for what you want and, while people may be kind and try to offer you things, the most valued things in life are what you have earned and not what you received."

While trying to establish themselves in Canada, my mother waited on tables. My mother shared with me stories about where her bosses and customers would make her life hell. They would often ridicule her because of her standing. Essentially, she was beneath them. My father would face similar experiences. While my father would go to school during the day, he would spend his evenings and nights working at a bakery cleaning ovens. Other people would also ridicule him for taking jobs away from non-foreigners. Even through all this negativity, my parents would still triumph over this adversity, earn their way through society and be relatively successful today. My father would move on to work as a Chief Marine Engineer in the Department of National Defense for Canada. My mother earned the necessary certifications and upgrades to be a bookkeeper.

As a young child, grit was instilled into my sister and me. Although, the word grit was not part of my regular vocabulary until my discovery of that word in my Master of Education program, synonyms related to grit were something that we ate and breathed. As the oldest child in my family, I had a very challenging time going to school. I grew up in a household that primarily spoke Vietnamese. Although my parents enrolled me into many pre-school programs

so I could pick up and learn English, I was clearly the odd duck in elementary school. Not only did I have a limited ability to speak English, but my at home Vietnamese culture was very different than that of the broader Canadian society.

I recall having difficulties initially making friends. My teachers did not know what to do with me because I lacked some of the social cues that many kids already had. Through all these experiences, my parents tried their very best to make me feel included in the broader school community. My mother was very involved in the events that happened in school. She volunteered in school events so I could feel included. I also remember her bringing in a cake to celebrate my birthday with my Grade Three class; all of this, in an effort to help me feel included and reduce the social stigma that I faced. As time would go on, my oddness still stuck, but I would be somewhat accepted among my peers.

Throughout my childhood, education was the most dominant aspect in my life. I came from a poor, single income family. Because of my challenging difficulties at school, my mother had to stop working to be involved in my everyday schooling. Every day, when I came home from school, my parents would force me to do additional homework. They would force me to read books, practice more mathematics problems and do monthly research on a wide range of topics. At the time, I hated them for forcing this on me. From my perspective, it got worse. In Junior High, my peers would go out and attend school dances, fundraisers and other social events. As much as I begged to be like my other peers, my parents would not relent, and I was stuck doing all this extra homework. At the time, I did not understand why my parents made me do all this extra work but now, as an adult, I realize that they wanted to build on my wealth of knowledge so that I can use such knowledge to get ahead in future education and careers.

As a teenager, being poor negatively impacted my confidence and self-worth. As I saw many of my peers wearing the latest brand name clothes and sporting the latest accessories, I looked at myself in the mirror and felt down in the dumps. Everything I wore or owned came from the thrift store or was donated by relatives. Peers ridiculed me and, as such, I became very socially isolated. My only other friends were people who had similar disadvantages to mine. I remember begging and pleading with my parents, but to no avail. There was simply no money to spend on frivolous items.

I remember having a difficult and emotional conversation with my parents. My father said, "Son, there is simply no money to spend on things that we do not need. When we are poor, we live with what we have. But you have a chance to change things for your future. You must work hard, gain an education, obtain a job that not only makes a lot of money, but makes you happy. Then, you can buy anything you want and need, and can also offer such luxuries to your own children one day." The experience of being poor and not getting the clothes and things I wanted was a major dominant force in my teenage and young-adult life. My parents taught me to be mindful of this hardship and to work incredibly hard to earn the things I wanted. Eventually, through dedication, persistence, and effort, I was able to graduate high school with decent grades and with some scholarships.

The spirit of persistence continued to occur in my university career. When I reflect on my past experiences in my undergraduate degree in physics and mathematics, I stumbled along the way. Through such difficulties, my motivation waned and, at certain instances, I wanted to give up. The most powerful and influential folks in my life have been my parents. From the day I was born, my parents constantly pushed me to do more than what I felt I could do. My parents often shared this point, "Son, when we left Vietnam, we had nothing. We came to a foreign country

with nothing but our clothes on our backs. We had to work, do our very best, and always push and strive for more than what we feel like we can do. If we can do that and make it to some comfortable success and have what we have now, you can do it too."

It was my parents past experiences fleeing Vietnam as refugees that gave me a source of inspiration for working hard. Their unwavering support, positive reinforcement and encouragement also kept me motivated to get back on the horse and ride again. Every time I fell, or felt like I wanted to give up, they got me back up and got me going again. Eventually, the trait of persistence would become normal for me. Whenever I want to give up, I reflect on my past experiences, and I continue going. In retrospect, I believe if it were not for my parents teaching me such gritty skills, I would not have been able to graduate from a very tough physics and mathematics degree.

The most powerful and most influential folks in my life have been my parents. From the day I was born, my parents emphasized the importance of hard work, dedication, tenacity, perseverance and having the necessary skills to overcome any challenge. A few years ago, right around the time I was exposed to the concept of grit, I was playing a video game called *Mass Effect: Andromeda*. In the game, there was dialogue related to a traumatic and difficult moment that occurred between several characters. In the dialogue, a quote was shared, "Pain emboldens our resolve." This quote resonated heavily with me because it is through the adversity and challenges that have happened in my life that fuels me with the necessary determination to overcome any challenges that I face.

It is important to recognize that there is never one singular story: a fact known from Chimamanda Adichie's TED Talk: *The danger of a single story*. I lived a childhood where I had a misunderstood sense of classism, marginalization from a dominant society, social isolation and

other systemic structures that made it incredibly difficult for me to be successful. It felt so hurtful and brought up so many negative emotions. That said, standing at a position of relative success and privilege, I once held the belief that, "If I could do it, why cannot others do it as well?" For some, the obstacles and barriers may be so insurmountable that one simply cannot move forward. I am somewhat privileged. I had the benefit of both parents being involved and a solid family dynamic that helped alleviate the pain in my life. Such resolve came from the careful parenting and upbringing I had. Yet, others may not have this type of privilege and therefore, there is a danger of generalizing my experiences to others because it dismisses the profound experiences, hardships and stories that are significant with others.

Positionality

When conducting any sort of research, it is important to offer the positionality of the researcher. The positionality of a researcher has a direct influence on the research process (Mason-Bish, 2019) because positionality comes from a personal stance one makes (Savin-Baden & Major, 2013). Savin-Baden and Major say, "A personal stance is a position taken towards an issue that is derived from a person's beliefs and views about the world. It reflects deeply held attitudes and concerns about what is important" (p. 68) and involves what the "researcher has chosen to adopt within a given research study" (p. 71). Therefore, these researchers provide many points to help researchers understand their positionality:

> What is your race/class/gender/age? How do these factors influence how you experience the world and view research? What are the issues you find the most important? How does that influence your view of research? In what ways has your education affected the way

you think about research? What other life experiences have influenced the way that you think about your research? (p. 68)

It is so crucial and important to acknowledge that the stories, events in my life and teachings my parents provided me with influenced how I perceived grit and success. In a world of different educational ideologies, many people subscribe to different beliefs and such beliefs should be addressed as part of any positionality. For instance, grit ideology is discussed in Gorski (2016). Gorski says that grit ideology falls between two broader ideologies. At one end of the spectrum is the deficit ideology. At the other end of the spectrum is structural ideology. In the education context, those who subscribe to deficit ideology believe that improving success can be done through the change of "attitudes, behaviors, cultures, and mindset" (p. 381). Fully adhering to deficit ideology completely dismisses the structural inequities that any individual student can face. Therefore, structural ideology recognizes that the disparity in education is due to the inequitable distribution of access and opportunities (e.g., poverty) (Gorski, 2016).

Being born in Canada and growing up with both Canadian and Vietnamese identities gave me the ability to view the world through an intersection of two cultures. It also allowed me to be mindful and acknowledge the differing cultural values and viewpoints that exist. What one person perceives as a Native-born Canadian may be different than that of a Vietnamese person. I will provide an example from my own personal experience. Throughout my life, I had to work hard in order to earn the things I wanted. I always put dedication and commitment to everything I do; nothing is done for the sake of completing a task. In comparing my experiences with other second-generation Vietnamese Canadians, my experiences are similar to theirs. To many Vietnamese people, this is part of our culture. However, when my non-Vietnamese colleagues make comments such as, "You are an overachiever" or "You are a try-hard," it completely

disregards and dismisses the cultural aspects that I live in. Therefore, having shared membership with both cultural groups has allowed me to be mindful of a world of different perspectives, perceptions and cultural values.

Family poverty was another aspect in my life that negatively impacted me. My parents always ensured that my sister and I had the basic necessities for everyday life. Anything that was related to school or learning always took priority, but any extravagant or frivolous items would not be considered. Growing up poor gave me the sensitivities in understanding how learning and success can be impacted through financial means. Students who have more access to resources can have a greater chance of success than those without. In my own context, if my parents could not afford food in the household or supply me with the necessary materials for school, I would have gone to school without the necessary resources to be successful.

Poverty was always countered with an incredible support system. I did not have much growing up but, whenever I felt like giving up due to the barriers I faced, my parents would constantly encourage me to get back up and try. They would dedicate significant sums of time to nurture and comfort me and provide me with the necessary motivation for me to continue moving forward. In my context of teaching high school physics, while some students have an incredible support system, some others do not. Such support structures are very important for their impact on grit. In my context, if I did not have the immense support from my parents, I do not believe I would be as successful as I am today.

I describe myself as sitting somewhere between both deficit and structural ideologies. Racial, cultural, poverty and support systems have been some of the most dominant factors that have impacted my grit and academic success. However, through many hardships, I owe much of my coping mechanisms and success to my parents. It is through their encouragement and

teaching that reinforced a change in my behaviour for the better. While my parents had a profound impact on my life trajectory, not everyone's experiences can be generalizable to mine. I am embarrassed that I once held the belief that, "If I could do it, why cannot others do it as well?" The danger in this type of thinking is that every person has the same privileges and opportunities as I. As an example, in the Indigenous community, the horrific trauma of the residential school program, in addition to discrimination, racism, oppression, colonialism, social isolationism and poverty resulted in multi-generational implications that have done long lasting harm and damage to the Indigenous people. Such horrific experiences are significantly different than mine and, therefore, using this example, my own generalization cannot be transplanted to others. Therefore, while I acknowledge that certain students face structural barriers that will require structural solutions, in this thesis I intend to explore how I might increase the agency of individual students through a better understanding of grit.

Methodological Approach

In my context as a high school physics teacher, I have lived much of my professional life thinking in the positivist paradigm of science. Kuhn (2012) describes a paradigm as an accepted example of scientific practice. Such examples "include law, theory, application, and instrumentation together … from which [models a] particular coherent tradition of scientific research" (p. 11). While studying in the sciences, I highly regarded the scientific method as being the highest standard of truth and reality and, as a result, it initially guided my perception of educational research.

It always intrigued me as to why so many of my education professors, who originally started their career as science and mathematics educators, chose to utilize pure qualitative research methods for educational research. As Denzin and Lincoln (2011) articulate, "politicians

and hard scientists call qualitative researchers journalists or soft scientists … their work is termed unscientific, only exploratory, or subjective" (p. 2). I had a huge dilemma to face; choose the positivist worldview or utilize qualitative methods.

Qualitative research methods differ from quantitative in their focus and approach. As Merriam (2009) suggests:

> Rather than determining cause and effect, predicting, or describing the distribution of some attribute among a population, we might be interested in uncovering the meaning of a phenomenon for those involved. Qualitative researchers are interested in understanding how people interpret their experiences, how they construct their worlds, and what meaning they attribute to their experiences. (p. 5)

As a teacher, there is so much more than obtaining data, interpreting it and applying statistics to inform my teaching practice. Through deep reflection, there is a certain degree of coldness that is attached to viewing my participants as cold hard numbers. By expressing students' experiences related to grit in terms of statistical tests and making inferences from the data, I believe it is as if my students are "impersonal subjects only to be mined for data" (Adams & Ellis, 2012, p. 206). Therefore, simply using a scientific generalization dismisses the important fact that every student's perception and experience are different.

Both quantitative and qualitative research methods serve different purposes. For example, in testing the effectiveness of different vaccines, a large statistical quantitative trial is run to answer, the how effective a vaccine is to a broader population. If my research study focused on the extent to which a higher degree of grit impact student grades in a high school physics classroom, a quantitative methodology would be appropriate. However, qualitative research

methods' focus is on answering the how and why questions (Merriam, 2009) related to how a participant makes sense of the phenomenon. In my study, the phenomenon of grit is deeply examined in relation to how participants experience it. This is to obtain a greater sense of how such a phenomenon impacts student success in a high school physics classroom. While quantitative research methods lean on hypothesis testing and statistical treatments of data, qualitative researchers write a thick and vivid description of a culture (Geertz, 1973) so that one can obtain a deeper understanding of the phenomenon at hand.

The methodological stance between quantitative and qualitative methodologies has led me to the recognition of what is/are truth(s) in the universe. Quantitative researchers believe in a single identifiable reality. This is a single truth. Such truth can be generalized into the development of scientific laws to explain the nature of reality. As Savin-Baden and Major (2013) say, "[Such singular truth] is based upon natural phenomena, their properties and relations as verified by science. Knowledge, then, is something that is to be discovered rather than something that is produced by humans, and researchers gain knowledge by identifying facts" (p. 19).

However, "Society does not exist in an objective, observable form, rather, it is experienced subjectively because individuals give it meaning by the way they behave" (Savin-Baden & Major, 2013, p. 6). According to Denzin and Lincoln (2011), qualitative researchers believe that nature can never be fully understood and, as a result, there is a belief in the existence of multiple realities (or multiple truths). Truths, in the sense of qualitative research, are socially constructed (Merriam, 2009). The socially constructed nature of reality focuses on how "individuals attribute meanings to events, concepts and situations, which is what researchers seek to understand" (Savin-Baden & Major, 2013, p. 13). Overall, the purpose of social construction in qualitative research is to understand how people make sense of their lives and their

experiences. It is important to note that, “In addition to the work of anthropologists and sociologists, people in professional fields such as education, law, counseling, health, and social work have often been interested in specific cases for understanding a phenomenon” (Merriam, 2009, p. 6).

Therefore, to obtain a deeper understanding and insight related to the culture and phenomenon of grit and student success in a high school physics classroom, I chose qualitative research methods because such a phenomenon differs from individual to individual. Each student who attends my class comes with unique experiences, backgrounds and challenges. Therefore, to obtain a deeper understanding of the nature of grit and student success, a deeper understanding is needed to recognize how students make sense of the experience at hand.

I chose to undertake an autoethnographic approach. Through an autoethnographical lens, I took a critical reflection of myself while I wrote and shared first-person personal narratives and stories, which helped me gain insight into the culture of grit and student success that occurred in my high school physics classroom. Adams, Jones and Ellis (2015) describe autoethnographic stories to be the stories of an individual’s “self through the lens of culture” (p. 1). Such stories provide a medium for those to “interpret personal and cultural experiences” (p. 1) that revolve around varying transformative moments in an individual’s life.

Autoethnography originated as a merger of both autobiography and ethnography (Adams & Ellis, 2012). When individuals write an autobiography, they retrospectively select and write past stories, assembled using a recollection of past memories (Adams & Ellis, 2012). In the case of individual ethnographers, such individuals enter a defined culture for an extended period. Such ethnographers use their observations and experiences—“repeated feelings, stories and happenings” (p. 201)—to write a thick and vivid description of a culture (Geertz, 1973). Then,

ethnographers would often connect their experiences and findings to formalized research. Ultimately, Adams and Ellis say, “Ethnography [aims] to create a representation of cultural practices that makes these practices familiar with cultural outsiders … [providing] readers a sense of being there in the experience” (p. 3). Because autoethnography acts as an intersection between autobiography and ethnography, it provides an appropriate medium for a researcher/subject to draw upon their own experience, story and self-narrative (Savin-Baden & Major, 2013), and to critically reflect on oneself in the context of a culture (Adams et al., 2015).

Rationale and Significance of the Study

I have always been interested as to why some students are incredibly successful. Regardless of the difficulty or challenge, what factors, circumstances, traits, qualities and experiences have allowed students to see progressive achievement regardless of the task? Physics is not an easy subject area. The higher-level mathematics combined with theoretical concepts can be a challenge for some. Yet, in my own personal experience, many students continue to overcome such difficult boundaries and reach new heights. Such success has always been fascinating to me and I wish to know more about why such students act the way they do. At the same time, some students do not experience such achievement, due to many different factors. Factors such as income, family structures, social structures and personality may have varying degrees of negative impact. Without formalized research to understand the factors that lead to success or failure, any hypothesis I put forward would just be conjecture.

Late into my Master of Education program, I discovered a term called grit. Grit, according to Duckworth et al. (2007) refers to passion and perseverance for long-term goals. In personal reflection, the ideology of grit from Duckworth et al. made the most sense to me. Much of my life is predicated upon the traits of grit. Such traits include hard work, determination,

perseverance, tenacity and effort. Yet, while the educational research around grit focuses on changing "attitudes, behaviors, cultures, and mindsets" (Gorski, 2016, p. 381), my experience around my own personal success is also connected to other structural factors including race, poverty, family circumstances and social connections (to name a few).

To determine varying degrees of grit, Duckworth et al. (2007) used the Grit-O test, while the newer and shorter survey, known as Grit-S from Duckworth and Quinn (2009), was also used. It is important to note that Duckworth et al. and Duckworth and Quinn have shown significant success in using such tests to predict the chances of success in many different educational and non-educational contexts. However, while Duckworth et al. and Duckworth and Quinn have acknowledged the structural barriers that may impact students' grit, neither the Grit-O nor the Grit-S test have items related to such structural factors.

Quantitative research into grit and student success provides us with some understanding of the phenomena, but does not, by its design, allow educators to hear individual voices of students. However, in my opinion, such voices are incredibly invaluable. Autoethnography provides a medium for disregarded and neglected voices (Adams et al. 2015) and such sources of information are significant because they will help aid our understanding of the existing research today. By connecting the literature review to my themes drawn from personal narratives and stories, I can determine whether "theory supports, elaborates, and/or contradicts personal experience … [it] provides a foundation on which to elaborate or provide a counter narrative to the meanings and implications" (Adams et al., 2015, p. 94) involved.

Limitations and Delimitations to the Study

In my autoethnographic study there were limitations and delimitations. According to Theofanidis and Fountouki (2019), limitations refer to the "potential weaknesses that are usually

out of the researcher's control" (p. 156). Two limitations arose. The first limitation was related to how different individuals may interpret my stories and findings. According to Denzin and Lincoln (2011), qualitative researchers believe that nature can never be fully understood and, as a result, there is a belief in the existence of multiple realities (or multiple truths). The socially constructed nature of reality may result in different individuals interpreting different experiences (Savin-Baden & Major, 2013) and, therefore, arriving at different conclusions. Muganga (2015) claims that, "since the interpretation of a situation depends on different views, interests, or purposes among researchers, multiple interpretations can emerge from one situation" (p. 71).

The second limitation was from sharing my epiphanic narratives and stories. It was not possible or feasible to share stories with those individuals in my stories because such individual students have either graduated and/or have been disconnected from me for a very long time. Understanding the interpretations directly from the students can align my interpretation to theirs and, greatly add to the understanding of students developing their grit and their pathways to success.

Theofanidis and Fountouki (2019) describe delimitations as "the limitations consciously set by the authors themselves" (p. 157). My study was limited in scope to the experiences I gathered from three individuals. These three students were chosen because they had provoked a significant epiphany. The experiences and perspectives yielded from my study may not produce generalizations. While I explored grit and its connection to the other psychological constructs such as motivation and mindsets, I also explored social constructs such as income and family structures. In order to focus my study on grit, there may be other relevant psychological and social constructs at play that were not addressed or explored.

While each student in my autoethnography was unique in their own way, I did not include African Nova Scotian and Indigenous students into my study. In my setting, it was very rare that I had African Nova Scotian or Indigenous students taking my physics classes. When I did have students from either demographic, my experiences at the time of writing did not provoke significant epiphanies. While one of my stories addressed a student from a first-generation Indian Canadian background, having other underrepresented students would have enhanced the study by providing a deeper understanding around cultural and racial identities, in addition to understanding how prejudice, discrimination and intergenerational trauma may have impacted students' grit and student success.

Definitions and Terminologies

The definition of major terms that were used in this study are defined:

Grit: Passion and perseverance for long-term goals (Duckworth et al., 2007; Duckworth & Quinn, 2009). Grit comprises of two domain-specific traits, perseverance of effort and consistency of interest.

Success: The fulfillment of personal achievements and goals (e.g., achieving certain set assessment outcomes, reaching a certain grade, strengthening of certain academic skills or development of strategies to overcome defeat).

Culture: A "shared pattern of thoughts, symbols, and actions typical of a particular group" (Hamilton, Smith & Worthington, 2008, p. 22). In an educational context, these researchers describe culture as the interpretation of language, actions and/or interactions.

Qualitative research methods: Denzin and Lincoln (2011) describe qualitative research as "a set of interpretive, material practices that makes the world visible. These practices [are

transformative]. They turn the world into a series of representations, including fieldnotes, interviews, conversations, photographs, recordings, and memos to the self" (p. 3).

Autoethnography: A "[qualitative] research method that uses personal experience ('auto') to describe and interpret ('graphy') cultural texts, experiences, and practices ('ethno')" (Adams, Ellis & Jones, 2017, p. 1).

Epiphany: Transformative moments of revelations that drastically alter the fundamental meanings of an individual's psyche (Denzin, 2014).

Big Five personality: "The Big-Five personality factors represent a central approach to the trait theory of personality" (Rimfeld, Kovas, Dale & Plomin, 2016, p. 780). The Big Five factors include extraversion, agreeableness, consciousness, openness and neuroticism.

Meritocracy: The belief that where individuals find themselves ending up in the world is a direct result of their effort or non-effort. It is the belief that no matter what position one finds themselves in society, they could, through their efforts, end up becoming a figurehead in society.

Deficit ideology: In an educational context, the dominant belief that people can change their success and situation through the recognition and change of "attitudes, behaviors, cultures, and mindsets" (Gorski, 2016, p. 381).

Structural ideology: In an educational context, the dominant belief that disparity in education is due to structural barriers and the inequitable distribution of access and opportunities (Gorski, 2016).

Summary

This chapter provides details around my autobiographical beginnings and my positionality. Both are relevant when conducting any formalized research. Grit, according to Duckworth et al., (2007), and Duckworth and Quinn (2009) refer to passion and perseverance for

long-term goals. Gritty individuals tend to have a high degree of success, whereas those who do poorly tend not to be successful and have a lower degree of grit. It is important to note that there are other extraordinary factors that also impact grit and are worthy of investigation. My autoethnography focuses on the examination of the culture of grit and student success in a high school physics classroom. Through the autoethnographical methodology, I write retrospectively, from past experiences and stories, and use such observations, experiences and feelings to write a thick and vivid description of the culture (Geertz, 1973). That said, autoethnographic study helps aid in the understanding of the existing research today.

In the next Chapter, *Chapter 2: Review of the Related Literature*, I will review the current and relevant literature related to grit. In *Chapter 3: Theoretical Framework and Methodology*, I will describe my methodological framework, information regarding my data collection process, approach to data analysis, credibility and quality, and ethical considerations. In *Chapter 4: Grit and Student Success in a High School Physics Classroom*, I share my autoethnography. In Chapter four, I provide the context to my physics classroom and, in addition, share three autoethnographic stories involving students in my class who radically transformed my understanding of grit and student success. Finally, in *Chapter 5: The Journey's Conclusion and Implications*, I connect the autoethnography to the existing literature review to see how such research aids, critiques and extends our understanding related to grit and student success.

Chapter 2: Review of the Related Literature

What factors, situations and contexts lead to the success of students in school? In a world of different educational ideologies, educators, policymakers and researchers exist in different ideological spectrums. One end of the ideological spectrum focuses on what students bring to their schools. This includes but is not limited to mindsets, personality, attitudes, behaviours and motivation. The other end of the spectrum focuses on structural factors including, but not limited to, socioeconomic status, race, gender and culture. In this chapter, I will begin to explore the construct of grit and also examine the structural factors that are tied to this construct.

Understanding Grit and Mindsets

When one examines success, the term can mean different things to different individuals and, therefore, success is context specific. Authors such as Duckworth et al. (2007) refer to success and achievement as the "accomplishment of widely valued goals" (p. 1087). Success does not necessarily mean passing a course. Success is defined as the fulfillment of personal achievements and goals (e.g., achieving certain set assessment outcomes, reaching a certain grade, strengthening of certain academic skills or development of strategies to overcome defeat). Duckworth et al. demonstrated a whole host of variables that factor into the success of students. Such attributes include "creativity, vigor, emotional intelligence, charisma, self-confidence, emotional stability, physical attractiveness, and other positive qualities" (p. 1087).

Duckworth was initially a Junior High Mathematics teacher. She also wrote the 2016 book *Grit: The Power of Passion and Perseverance*. Duckworth wondered why some students were outperforming others. In trying to understand the reasoning for this, she compiled the IQ scores of her students and found that some of the best performers did not have the highest IQs; however, some of her best performers had lower IQs (Hochanadel & Finamore, 2015). There are

many other factors that also impact students' grades, including personal, social and environmental factors (Duckworth et al, 2007; Willingham, Pollack & Lewis, 2002).

Grit is a term coined by Duckworth et al. (2007) as passion and perseverance for long-term goals. It is the ability for an individual to persist and overcome challenges when facing significant obstacles and barriers. Since the seminal research regarding grit by Duckworth et al., grit has received much attention from both researchers and classroom teachers. It is a curiosity to wonder whether the construct of grit alone can determine the success of students in mainstream classrooms or are there additional contexts and factors that impact successful, gritty students? Although Credé, Tynan and Harms (2017) have mentioned that grit has been widely used as an important predictor of success and performance, there may be other considerations that fundamentally change the grittiness of individuals. Such contexts and factors are explored in this literature review.

Historical Aspects Related to Grit and Mindsets

At the outset, Duckworth et al. (2007) proposed that higher levels of grit are required for higher levels of achievement. Through numerous interviews with those in academia, medicine, law, politics, commerce and finance, interviewees suggested a close synonym to grit was talent as one of the primary reasons for high levels of achievement (Duckworth et al., 2007). Duckworth et al. drew upon Galton (1892) as one of the earliest works that drew a strikingly similar picture to the aspect of grit. Similar to Duckworth et al.'s (2007) research, Galton also drew upon biographical information from a similar pool of interviewees to determine why high performers were indeed high performers. Galton believed the highest performers had a capacity to sustain significant effort towards achievement and also had the passion to do so. This was a hallmark for the overarching themes of grit. Duckworth et al. utilized Cox (1926) to show that

individuals who held a steady IQ throughout their lives had traits that resembled determination, motivation, effort, confidence and a strong willpower. Although the IQ score is important for achievement, Duckworth et al. (2007) do not abandon the notion that traits of grit are even more important for high levels of success.

What is Grit?

Throughout much of the literature, grit is synonymous to ferocious determination, conscientiousness, resiliency, self-control, sustained effort and a strong ability to persevere when challenges arise (Duckworth et al., 2007; Duckworth & Quinn, 2009; Hill, Burrow & Bronk, 2016; Hochanadel & Finamore, 2015; Muenks, Wigfield, Yang & O'Neal, 2017; Noftle & Robins, 2007; Rimfeld et al., 2016). In defining grit, Duckworth et al. (2007) state:

> [Grit is defined as] perseverance and passion for long-term goals. Grit entails working strenuously toward challenges, maintaining effort and interest over years despite failure, adversity, and plateaus in progress. The gritty individual approaches achievement as a marathon; [their] advantage is stamina. Whereas disappointment or boredom signals to others that it is time to change trajectory and out losses, the gritty individual stays the course. (p. 1088)

Muenks et al. (2017) showed that grit emerged from personality theory. To better understand personality, Rimfeld et al. (2016) share the Big Five factors that make up an individual's personality. Such Big Five factors are "Extraversion, agreeableness, conscientiousness, openness, and neuroticism" (p. 780). It should also be noted that the Big Five factors are also known as the Five-factor model (FFM) of personality (Poropat, 2009). Rimfeld

et al. state, “The Big Five personality factors represent a central approach to the trait theory of personality—they constitute an empirically verified taxonomy of traits” (p. 780).

Grit is found to be closely affiliated with conscientiousness, more so than the other Big Five factors (Duckworth et al., 2007; Dumfart & Neubauer, 2016; Hill et al., 2014; Poropat, 2009; Rimfeld et al., 2016; West, Kraft, Finn, Martin, Duckworth, Gabrieli & Gabrieli, 2015). In providing further clarity, Duckworth et al. (2007) share that it is simply not conscientiousness that leads to success, but it is “working diligently towards the same higher order goals over extremely long stretches of time” (Eskreis-Winkler, Shulman, Beal & Duckworth, 2014, p. 2).

How is Grit Measured in Subjects?

To measure grit, Duckworth et al. (2007) developed a 12-item survey with each question having a Likert scale. This test (listed as Grit-O) comprised “a higher-order construct with two lower order facets: perseverance of effort and consistency of interest” (Credé et al., 2017, p. 492). Perseverance of effort is described as an individual’s propensity to actively work towards long-term goals (Duckworth et al., 2007; Muenks et al., 2017). Duckworth et al. (2007) describe individuals with a high-degree of perseverance of effort as always demonstrating consistent determination towards sticking to a higher-order goal. Such individuals work consistently, even in the absence of positive feedback (Duckworth et al., 2007; Duckworth & Quinn, 2009). Duckworth et al. describe consistency of interest in terms of passion. Consistency of interest refers to an individual’s propensity to enjoy engaging in the same activities over and over through time. Duckworth et al. describe it as the tendency not to abandon a goal because of novelty. There is evidence that an individual’s success hinges on both the perseverance of effort and consistency of interest in very demanding situations (Credé et al., 2017; Duckworth et al., 2007; Duckworth & Quinn, 2009).

Examples of the consistency of interest questions from the Grit-O developed by Duckworth et al. (2007) are: New ideas and projects sometimes distract me from previous ones; My interest change from year to year; and, I become interested in new pursuits every few months. Examples of the perseverance of effort questions are: I finish whatever I begin; Setbacks don't discourage me; and, I have achieved a goal that took years of work. Depending on the questions, a 5-point score on a Likert scale is given. Certain questions show a range—with 1- being 'not at all like me', and 5- being 'very much like me.' Depending on the question, some are asked in reverse and, therefore uses reversed score items (see https://angeladuckworth.com/grit-scale/). Once an individual completes the survey, the results are averaged to determine an overall grit score.

Grit is measured using either the above Grit-O, or the newer and shorter 8-item survey known as the Grit-S survey (see Duckworth & Quinn, 2009). In revising the Grit-O survey, Duckworth and Quinn (2009) eliminated items from the Grit-O survey that were not "predictive of various outcomes across several samples of participants" (Muenks et al., 2017, p. 601). As a result, Duckworth and Quinn's Grit-S survey became significantly better than the original Grit-O survey. Duckworth and Quinn state; "The 8-item Grit-S is both shorter and psychometrically stronger than the 12-item Grit-O …, we recommend the Grit-S as an economic measure of perseverance and passion for long-term goals" (p. 174). Although both Grit-O and Grit-S surveys have two lower order facets, Duckworth et al. (2007), and Duckworth and Quinn (2009) do not distinguish them differently on their grit tests, as both types of questions are merged, and mixed within the surveys.

Mindsets, Entity Theory and Incremental Theory

To understand one of the possible reasons why certain individuals possess more grit requires one to understand the mindsets of individuals. An individual's own belief system has much to do with an individual's own achievement and growth (Dweck et al., 1995). Hochanadel and Finamore (2015) shared that Duckworth and Dweck worked together to understand why some students succeeded in reaching academic goals and why others give up. Duckworth et al. (2007) and Dweck et al. believed that it was not a lack of intelligence that led students to failure but rather, it was a lack of effort that, therefore, caused some students to question their belief system; 'I am bad at math because my family is bad at math,' versus, 'I am successful at math because I put in a lot of effort, I ask for help and I practice a lot.'

In 2006, Dweck released her book *Mindset: The New Psychology of Success*. Dweck (2006) claims:

> When you enter a mindset, you enter a new world. In one world—the world of fixed traits—success is about proving you're smart or talented: validating yourself. In the other—the world of changing qualities—it's about stretching yourself to learn something new; developing yourself. (p. 15)

It is worth noting that Dweck (2006), Duckworth et al. (2007), and McGonigal (2016) are authors who build the notion of incremental theory. Incremental theory is a concept in which an individual can experience growth and develop over time through hard work, sustained efforts, and have the stamina and wit to persevere while navigating adversities and obstacles. McGonigal's *The Upside of Stress* (2016) was written to change the reader's perception and mindset of stress. McGonigal shares that, in our current paradigm, stress is often perceived as a

bad thing and must be avoided to live healthy lives. However, McGonigal counters this paradigm by emphasizing that stress is the human body's response to increased demands on itself. McGonigal utilized the understanding of mindsets and interpreted a mindset as "a belief system that biases how you think, feel, and act … it's like a filter that you can see everything through" (p. 11).

Mindsets and their Relation to Grit

Much of the work regarding fixed versus malleable traits in an individual's learning, growth and achievement can be ascribed to Dweck et al. (1995). These researchers believe, "people's assumptions about the fixedness or malleability of human attributes predict the way they seek to know their social reality, as well as the way in which that reality is experienced and responded to" (p. 282). It can be said that individuals who believe that they have fixed-like, and non-malleable qualities of intelligence are bounded by entity theory (fixed mindset), but those who believe that intelligence is malleable and can be progressively changed follow incremental theory (growth mindset) (Dweck et al., 1995). These researchers further assert that an individual's own assumptions and beliefs about the fixed and growth mindsets "can be seen as a core assumption in an individual's worldview" (p. 268).

Dweck et al. (1995) showed that individuals whose mindset believed that intelligence is a fixed trait and cannot be changed regardless of effort and persistence can be attached to entity theory: "Entity theory portrays a world that is relatively stable and predictable" (Dweck et al., 1995, p. 281). Conversely, individuals who believed that intelligence is cultivatable through sustained efforts, determination and practice can be associated with incremental theory. Individuals who follow the incremental theory believe a worldview that is "more dynamic and complex" (Dweck et al., 1995, p. 281).

Individuals' actions may be tied to their mindsets. Like McGonigal (2016)'s quote on mindsets being a "belief system that biases how you think, feel, and act" (p. 11), Dweck et al. (1995) illustrate that individuals with entity mindsets tend to have less grit, less adaptability and poor coping mechanisms. Such individuals would show a greater tendency to blame themselves because they were not born more capable of achieving success. Dweck et al. share, "This tendency towards global self-judgments is usually accompanied by a greater vulnerability to other aspects of a helpless reaction, such as negative [affect], disrupted performance, or the abandonment of constructive strategies" (p. 275). Contrast that with those who subscribe to an incremental mindset. These authors believe that such individuals would likely blame their negative outcomes upon a lack of study effort strategies to overcome such situations.

Facets and traits of perseverance of effort seem to be connected to incremental theory (growth mindset). How an individual perceives themselves through their mindsets can determine their varying levels of grit. When one examines grit through entity theory, there must be a consideration of other direct or indirect factors that impact the mindset of an individual. There are other possible considerations that could impact the mindsets of individuals and, in turn, impact grit. Dweck et al.'s (1995) research found that a person's perception of ability may predict performance. If individual students can change their perspectives to understand that their brain is malleable, through neuroplasticity, they can be taught to have a growth mindset and, thus succeed at any feats or challenges. Duckworth et al.'s (2007) grit test was derived from the understanding of perseverance of effort and consistency of interest. Perseverance of effort is based on developing long-term strategies for improvement which connects itself well to Dweck et al.'s (1995) work. As Duckworth et al. (2007) put it, "having a growth mindset could develop grit" (p. 49).

As an example, Dweck et al. (1995) showed the differing behaviours of students who held a fixed versus growth mindset. These researchers provided two sets of tasks for students to try. Students had a choice between either set of tasks. One of the tasks given to students allowed them to avoid negative judgments. This task did not give students an opportunity to learn anything new and only reaffirmed the student's abilities with positive grades. Conversely, in the other set of tasks, the researchers provided students with a challenge and gave them an opportunity to increase their capabilities. However, this particular task may expose students to criticism and cause some students to experience negative grade outcomes. As a result of the study, the researchers demonstrated that students who held the fixed mindsets chose tasks that ensured positive outcomes, but at the expense of a meaningful learning opportunity. It can be inferred that gritty students chose to find learning opportunities that allowed them to grow, even at the expense of potential criticisms and lower grades.

What is the Result of Having Grit?

Duckworth et al. (2007), and Duckworth and Quinn (2009), were able to show that greater achievements tended to be associated with higher levels of grit. Dweck et al. (1995), who studied fixed versus malleable traits in an individual's learning, demonstrated that, for those who struggle, it might in part be due to having a fixed mindset and a lack of grit. The growth mindset tells learners that, with goal setting, effortful practice and ability to persevere through challenges, one can succeed and become grittier. Duckworth et al. (2007) believe that such individuals form a strong study discipline by focusing on weaknesses and building them into strengths. Therefore, as these researchers share in their research, those with purposeful commitment have a positive correlation to that of grit.

Across many studies that Duckworth et al. (2007) conducted, “grit accounted for significant incremental variance in success outcomes over and beyond that explained by IQ, to which it was not positively related” (p. 1098). According to these researchers, grit was also associated with cumulative GPA among undergraduates at a university they studied: “Gritty students outperformed their less gritty peers” (p. 1093) and, with that, higher scores were associated with higher GPAs (Akos & Kretchmar, 2017). Duckworth et al. do share that some grit scores were also associated with lower SAT scores when examining the GPA scores at the university under study.

Akos and Kretchmar (2017) found that Grit-S significantly predicted first-year GPA after controlling certain variables, such as highest test scores, strength of high school curriculum, high school grades, and first-generation college status. It appears that educational attainment and age has an impact on grit. Duckworth et al. (2007), and Duckworth and Quinn (2009) were able to demonstrate that not only were higher levels of grit often related to higher levels in GPA, but also individuals with higher educational achievements (a college diploma versus a Bachelor’s degree) tended to be grittier. Grit gradually increases with age (Duckworth et al., 2007; Duckworth & Quinn, 2009; Eskreis-Winkler et al., 2014). For Eskreis-Winkler et al., students with higher-levels of grit had a greater chance of success in graduating high school. According to West et al. (2015) grittier elementary students showed long-term test score gains in math and English language arts, a reduction in absenteeism and excellent productive behaviours from fourth to eighth grades. Consequently, there is abundant evidence that having higher levels of grit lead to a better chance of success for achievement, both in the educational realm and in adulthood. It is important to note that there are other hidden factors that may limit our understanding of grit and student success. Ivcevic and Brackett (2014) acknowledge this

limitation through their sampling techniques. The authors used samples from students, largely derived from private schooled, middle-class family backgrounds. Such a sample could hide how socioeconomic status or systemic barriers may impact grit.

Grit as a Domain-General or a Domain-Specific Trait

Whenever an individual completes Duckworth et al.'s (2007) Grit-O, or Duckworth and Quinn's (2009) Grit-S test, they are doing either an eight or ten item survey. The survey consists of questions that are themed into two domain-specific traits: perseverance of effort and consistency of interest. Upon completion of the Grit-O or Grit-S test, an overall score is obtained, and this score comprises a domain-general score (Muenks et al., 2007). In Muenks et al.'s (2007) work, research was conducted by breaking down the domain-general score into their domain-specific items. When broken down, success related to school achievement was strongly associated with responses that favored perseverance of effort rather than responses favoring consistency of interest (Muenks et al., 2017). While Duckworth and Quinn (2009) seem hesitant about labeling grit as domain-specific, they suggest that further investigations are also needed.

Many researchers have explored the domain-specificity of the grit test. Credé et al. (2017) found that, by examining only the perseverance of effort score, there was indeed a significant positive correlation to high school GPA scores, more so than that of the consistency of interest score. Steinmayr, Weidinger and Wigfield (2008) and Credé et al. (2017) also arrived at the same results as Muenks et al. (2017) when controlling for personality, engagement and motivation constructs. Akos and Kretchmar (2017) found the consistency of interest score provided no additional information in explaining first-year GPA; however, perseverance of effort was "enough to explain the variance in [first-year GPA]" (p. 183).

Rimfeld et al. (2016) suggest a reason why consistency of interest does not significantly predict school achievement:

> Consistency of interest has both positive and negative effects on scholarly achievement. Although it is good to keep focused and interested in the task at hand, it is also sometimes more adaptive to focus on new ideas and projects without distraction from previous interest. (p. 786)

Contextual Aspects of Grit and Student Success

Ivcevic and Brackett (2014) suggest that utilizing grit to determine the broad success of students should be avoided because, while some students may be interested in subjects and activities, "they are unlikely to be passionate about all subjects in school" (p. 266). Therefore, these researchers recommend that grit may be better used for very narrow and focused goals. Steinmayr et al. (2018) found differing grit scores in their study of students in math and German language classes. This is because, while some students can be very gritty in one domain (e.g., mathematics), they may not be as gritty in another domain (e.g., language classes).

Personality, Motivation and the Big Five Inventory

Grit, Personality and the Big Five Inventory

In the previous section, I discussed how mindsets are related to grit. I introduced the aspect of personalities being linked to the Big Five personality inventory. Rimfeld et al. (2016) describe the Big Five factors as extraversion, agreeableness, conscientiousness, openness and neuroticism. These authors say, "The Big-Five personality factors represent a central approach to the trait theory of personality—they constitute an empirically verified taxonomy of traits"

(p.780). Noftle and Robins (2007) and Poropat (2009) believe these Big Five factors should be correlated with academic performance. In Dumfart and Newbauer's (2016) research, their meta-analysis showed that conscientiousness is the best predictor for achievement because of the traits associated with successful learning.

To describe the Big Five factors, Caspi, Roberts and Shiner (2006) describe those with extraversion to be expressive, energetic and sociable. Such individuals have strong positive emotions. Contrast this with those who are introverted, where such individuals are quiet, seldom to socialize and reserved. Those who have a strong degree of agreeableness have positive traits such as cooperation, empathy, politeness and are willing to accept other individuals' points of view. This is contrasted with disagreeable individuals who are aggressive, stubborn and set in their ways. Such individuals are often unwilling to accept other individuals' points of view.

As discussed previously, Grit is found to be closely affiliated with conscientiousness, more so than the other Big Five factors (Duckworth et al., 2007; Dumfart & Neubauer, 2016; Hill et al, 2014; Poropat, 2009; Rimfeld et al., 2016; West et al., 2015). Conscientious individuals are described by Caspi et al. (2005) and Poropat (2009) as being incredibly persistent and determined in their tasks, responsible, independent and attentive. Such conscientious individuals have "the capacities to sustain attention, to strive towards high standards, and to inhibit impulsive behaviors" (Caspi et al., 2005, p. 473). When compared to those who have a poor degree of conscientiousness, such individuals are not responsible and, as such, are often unreliable and have lower self-control (low achievement motivation). Caspi et al. and Poropat claim that those who display openness often share similar overlapping traits to that of extraversion and agreeableness and, as such, are often imaginative and creative. Therefore, these traits form what De Raad and Schouwenburg (1996) consider to be the ideal student.

Finally, neuroticism, as described by Caspi et al. (2005), is deeply connected to negative emotionality. These researchers describe neurotic individuals as seeing the world as threatening. Neurotic individuals "are anxious, vulnerable to stress, guilt-prone, lacking in confidence, moody, angry, easily frustrated, and insecure in relationships; individuals low on this trait are emotionally stable and adaptable" (p. 457).

How is Grit and Achievement Related to the Big Five Factors?

In taking only the Big Five factors into consideration, students with a low commitment to their studies may end up with poor success and be graded accordingly (Willingham et al., 2002). Therefore, important "traits such as conscientiousness, self-control, and grit appear to contribute to students' ability to sustain effort at academically demanding tasks" (West et al., 2015, p. 2). Willingham et al.'s research showed that positive behaviours contributed to grade predictions. They noted that scholastic engagement helped determine the success of individual students. Scholastic engagement included "coming to school, participating in class, refraining from misbehavior, and doing the work assigned" (p. 26). Willingham et al. elaborated that, "engagement means abstaining from pursuits that take undue time and commitment away from schoolwork; for example, killing time and involvement with drugs and gangs" (p. 26).

Duckworth et al. (2007) showed that Grit-O is related to conscientiousness more so than the other Big Five factors of neuroticism, agreeableness, extraversion and openness to experience. This is also confirmed in Duckworth and Quinn's (2009) work with the Grit-S test. Poropat (2009) claims that students who have low conscientiousness would be twice as likely to fail. Ivcevic and Brackett (2014), Rimfeld et al. (2016), and Steinmayr et al. (2018) also reaffirm the conscientiousness connection to grit. Conscientiousness is a major factor in determining positive grade outcomes. Duckworth et al. (2007), and Duckworth and Quinn (2009) do not

believe that grit is conscientiousness because it relates specifically to long-term focus, interest and stamina for long-term goals. For Noftle and Robins (2007) and Poropat (2009), there is an agreement with the conscientiousness statement, but both also shared that agreeableness and low neuroticism are also factors contributing to academic achievement. As a result of this, there are other possible situations and contexts, other than conscientiousness, that are tied to grit. It could very well be that extraversion and neuroticism may also be major factors of consideration when one examines the structural barriers and factors (Carter, 2008; Gorski, 2016).

Positive Affect and Grit

With the increased awareness of the importance of mental health to learning and well-being, much more emphasis has been placed on positive emotions; confidence and security are increasingly seen as contributory factors that impact grit and the success of individuals. In connection to the Big Five factors, Caspi et al. (2005) showed that negative emotions are deeply related to high neuroticism; such individuals are anxious, susceptible to stress, low in confidence and insecure. Hill et al.'s (2016) research on emotions, Hanson, Ruff and Bangert's (2016) work on positive and adaptive personality profiles, and Ivcevic and Brackett's (2014) work on Emotional Regulation Ability may prove useful in examining how such factors are related to grit.

Duckworth et al. (2007) and Duckworth and Quinn (2009) showed that individuals who demonstrated a higher level of grit typically have a better positive personality profile (e.g., stronger emotional stability, extraversion, openness to experiences, agreeableness and conscientiousness) and lower levels of neuroticism. Hill et al. (2016) suggest this is because individuals who have a strong personality profile build on their existing base of positivity and optimism and, for that reason, they "are better able to persevere in their goal pursuit, which could prove more difficult without a base of positive emotionality" (p. 259). It can be said that those

with a positive attitude will have the ability and eagerness to learn and be able to persist through obstacles and challenges (De Raad & Schouwenburg, 1996; Poropat, 2009).

Motivation and Grit

Motivation is related to grit because individuals may be motivated to do something purely out of internal interest (e.g., inherent satisfaction) (Ryan & Deci, 2000; Von Culin, Tsukayama & Duckworth, 2014). Motivation is also related to grit in the sense that it may reward an external outcome (Ryan & Deci, 2000; Von Culin et al., 2014). Ryan and Deci describe people's innate ability to be self-motivated; "At their best, they are agentic and inspired, striving to learn; extend themselves; master new skills; and apply their talents responsibly" (p. 68).

Ryan and Deci (2000) describe motivation as being "moved to do something … [individuals are] energized or activated toward an end" (p. 54). However, individuals who are not motivated, or are amotivated, typically have "no impetus or inspiration to act" (Ryan & Deci, 2000, p. 54). The researchers provide a range of factors that impact on the motivations of individuals, including resistance, perceived control, disinterest, attitude, resentment and a lack of acceptance of the value of a task. Individual differences in mindsets provide one of the possible reasons why individuals are either motivated or amotivated (Poropat, 2009; Von Culin et al., 2014).

According to Ryan and Deci (2000), there are varying degrees of motivation. Such motivations are influenced by a perceived locus of control. This is also known as a perceived locus of causality. The "locus of control is the belief that life events are causally attributable to one's own actions" (Radl, Salazar & Cebolla-Boado, 2017, p. 221). Is an individual student motivated by some internal factor to succeed or is an individual student motivated by some

external reward? Intrinsic motivation is defined as "the doing of an activity for its inherent satisfaction rather than for some separable consequence" (Ryan & Deci, 2000, p. 56). The reward must be meaningful to the individual. As Ryan and Deci describe, intrinsically motivated individuals act not for any instrumental reason, but purely for the positive experiences gained from extending themselves further; essentially, "the reward [is] in the activity itself" (p. 57). Individuals who have the purest intrinsic motivation are those who measure themselves as doing a task purely out of free choice (Ryan & Deci, 2000).

Individuals with a high-degree of intrinsic motivation are individuals who experience satisfaction due to competence and autonomy (Ryan & Deci, 2000). Having the autonomy to complete tasks without external regulation and positive performance feedback fosters an internal perceived locus of causality (internal locus of control), thus improving intrinsic motivation (Ryan & Deci, 2000). Extrinsic motivation differs from intrinsic motivation because the performance of an activity is used to satisfy and "attain some separable outcome" (Ryan & Deci, 2000, p. 60). Such outcomes may be driven by external factors such as rewards and punishments, ego-involvement, and to maintain feelings of self-worth, to name only a few (Ryan & Deci, 2000). Although the feelings of self-worth have connections to internal regulation, Ryan and Deci mention that such feelings are connected as a result of an external perceived locus of causality (external locus of control).

Intrinsic motivation is related to grit because "intrinsic motivation [is] the inherent tendency to seek out novelty and challenges, to extend and exercise one's capacities, to explore, and to learn" (Ryan & Deci, 2000, p. 70). The notion of extending one's capacities speaks to the theme of grit. Individuals with a high degree of grit are motivated to dedicate themselves persistently to a task, which entails working on challenges that meet or exceed a set goal,

regardless of the immediate pleasure involved (Von Culin et al., 2014). Interestingly, Von Culin et al. showed that individuals who were extrinsically motivated were less gritty than their intrinsic peers. "We conjectured that individuals motivated to seek happiness through immediate pleasure would be less inclined to maintain abiding focused interest over time" (Von Culin et al., 2014, p. 2). As a result of Von Culin et al.'s work, motivated "individuals who seek pleasure in life were [found to be] less gritty than their more stoic peers" (p. 5); this is because the motivation for quick and immediate pleasure "may impede grit by discouraging sustained interest over time" (p. 5).

While grit is important and became increasingly important as Duckworth et al.'s (2007), and Duckworth and Quinn (2009) published new research, I do want to also acknowledge that an understanding of structural factors needs to be considered as well.

Social and Familial Structures

Deficit, Structural and Grit Ideologies

Despite the advances and good intentions of many educational researchers who examine grit, it would be imprudent not to recognize the social, racial and familial structures related to grit and the success of students. Gorski (2016) examines the social structures related to grit ideology. Meritocracy is the belief that where individuals find themselves ending up in the world is a direct result of their effort or non-effort. It is the belief that no matter what position one finds themselves in society, they could, through their efforts, end up becoming Prime Minister. In the United States, it is best expressed by the myth of Horatio Alger, or the belief that one may rise from a background of poverty and, through working hard, end up becoming a millionaire. Gorski describes it as the belief that "what one achieves is directly proportional to how hard one works" (p. 378). This meritocracy also extends to the student context; "[students] who demonstrate high

performance through hard work and individual effort in formal education can achieve positive future outcomes" (Carter, 2008, p. 467). Critical educational researchers have shown us that meritocracy is a myth (Apple, 2010; Cummins, 2021; Ladson-Billings, 2021).

Unfortunately, this ideal is often not the case for many students (Carter, 2008; Gorski, 2016; McIntosh, 2005). When one considers McIntosh's concept of the invisible knapsack, some students come into a classroom having a certain privilege when compared to others. McIntosh describes this type of privilege as "an invisible package of unearned assets which [an individual] can count on cashing in each day" (p. 278). In McIntosh's case, she describes such unearned assets being drawn from an identity of a White person, who is part of a dominant-culture. Such attributes put her at a distinct advantage over others. Such unequal power structures leave McIntosh having far more opportunities when compared to other non-White, non-dominant-class individuals.

In a world of different educational ideologies, educators, policymakers and researchers exist in different ideological spectrums. For Gorski (2016), deficit and structural ideologies exist on two ends of a wide spectrum and are not treated as a binary. Those who subscribe to a deficit ideology believe that "poverty is the natural result of ethical, intellectual, spiritual, and other shortcomings in people who are experiencing it" (p. 381). This is the dominant ideology as described by Gorski. Therefore, in an educational context, educators who believe in deficit ideology believe people can change their success and situation through the recognition and change of "attitudes, behaviors, cultures, and mindsets" (p. 381). Often, there is a lack of recognition and/or importance put on the structural inequities. In a world of inequity and problems deeply rooted due to unequal power structures, equal opportunity simply does not exist

(Gorski, 2016; McIntosh, 2005). As a result, the term equal opportunity only acts to "[deny] that systems of dominance exist" (McIntosh, 2005, p. 281).

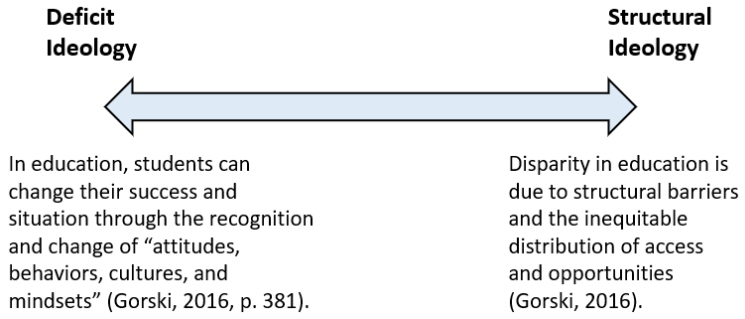

Figure 1: The spectrum of deficit and structural ideology as described by Gorski (2016).

Structural ideology is on the polar opposite end of deficit ideology. Educators who associate with structural ideology believe that disparity in education is due to structural barriers and the inequitable distribution of access and opportunities (Gorski, 2016). Gorski describes grit ideology as falling somewhere between deficit ideology and structural ideology because it recognizes that other structural barriers are at play. Although there is recognition of structural barriers within Duckworth et al.'s (2007) and Duckworth and Quinn's (2009) research, the questions involved with a grit test excludes aspects of poverty, instability, students' inequitable access to school resources and unjust school policies. "By overemphasizing grit … we tend to attribute a student's underachievement to personality deficits like laziness" (Gorski, 2016, p. 383) and, therefore, ignore the structural inequities students face.

Systemic Barriers for Black, Indigenous and/or People of Color (BIPOC)

In taking the experiences from McIntosh's (2005) invisible knapsack, students who identify as Black, Indigenous and/or people of color (BIPOC) are often at a disadvantage due to their unequal power structures with a predominately White culture. The racism and other

compounding oppression they face at the macro-level of the society are too often replicated at the micro-level of the classroom or the school. Although grit ideology recognizes structural inequities, the overwhelming belief from politicians, policymakers and researchers is that students can succeed and improve in school by focusing on changing mindsets, behaviours and attitudes, and without significant and meaningful considerations of systemic and structural barriers (Gorski, 2016).

In Western society and, most notably, the United States of America (USA), Carter (2008) describes the USA as the "land of opportunity where people can go as far as their own merit takes them" (p. 466). Due to Canada's close geography to the USA and the close cultural ties that exist between both countries, this merit-based ideology also exists in Canadian life. The meritocracy, as described by Gorski (2016), Carter (2008), and McIntosh (2005), does not necessarily apply to BIPOC because the belief is founded on what White and/or middle-class students hold as their value. In the local context of Nova Scotia (N.S.), Canada, the Black Learners Advisory Committee (1994) (or BLAC) released their report, *BLAC Report on Education*. In this report, the Black Learners Advisory Committee states, "Black Nova Scotians, like other Black Canadians, are victimized by a racist ideology and a racist social structure. Racism permeates the entire socio, economic, political, and cultural environment of Nova Scotian and [Canadian society]" (p. 34) and, evidently, there is a significant "level of educational disparity between Black Nova Scotians and the average Nova Scotian" (p. 36). This level of disparity significantly impacts the legitimacy of grit (Gorski, 2016).

According to Carter (2008), there are several reasons as to why Black students resist schooling. One such reason is around the perception of "race-based labor market discrimination as a relatively permanent barrier that cannot be overcome through the educational system" (p.

468). The second issue is around the perception of control, assimilation and indoctrination of Black students:

> The perception that schools are primarily controlled by Whites lead Black students to actively resist activities and behaviors associated with academic success, since these activities are equated with assimilation into the White middle-class and thus viewed as compromising a Black social identity. (p. 468)

One of the reasons why Black students fail secondary school programs is the racial discrimination that occurs through the non-recognition of social histories, cultures and traumas that exist in Black communities (Black Learners Advisory Committee, 1994). In addition to this dismissive (or non-appreciative) attitude, a poor Eurocentric-driven curriculum, attitudes from teachers, staff and peers, and finally, perceptions and stereotypes of Black learners, create an endless and vicious cycle of disparity. As the Black Learners Advisory Committee says, "Isolation from cultural roots can result in both psychological and emotional harm to Black children" (p. 52).

The negative impacts on scholarly success do not only impact Black students, but any racial or ethnic group outside of a dominant culture. In the examination of immigrant and non-immigrant students in German schools, Hannover, Morf, Neuhaus, Rau, Wolfgramm and Zander-Music (2013) showed that immigrant students who did not identify themselves as part of the overall German school culture were not as successful as their native-born counterparts. The researchers describe the barriers of academic success being deeply rooted from negative peer interactions, stereotypes in the school environment and a vulnerability to discrimination.

This statement by Hannover et al. (2013) reflects well with the systemic barriers faced by Black students; “Systemic discrimination [whether] consciously or unconsciously motivated by ignorance and racial stereotyping, lowers the expectations that school personnel have of Black youth” (Black Learners Advisory Committee, 1994, p. 52). However, for “students who described their self as including both aspects of their ethnic group and Germany, and students who saw themselves predominately as German, outperformed students with purely ethnic school-related selves” (Hannover et al., 2013, p. 175). For students who identify as BIPOC, Carter (2008) describes students who maintain their identity within the broader dominant society as cultural straddlers. Carter defines such students as cultural straddlers because of their ability to “successfully negotiate primary and dominant cultural codes in school in order to acquire academic success while also affirming and maintaining strong pride in their racial and ethnic heritages within the school context” (p. 469). “What differentiates these Black achievers from other Black students who develop strategies for maintaining academic success is that they do not view school success as White property” (Carter, 2008, p. 470). Instead, Carter say, “students resist and defy these ideas by embracing the notion that school achievement is a raceless human trait that can be pursued by individuals of any racial or ethnic group” (p. 470).

Consequently, the social environment and attitudes from people in the school (e.g., staff and students) are crucial for maintaining the success of students. Students who feel connected to their school and their fellow peers ultimately experience much more success because their social needs are met (Gore, Thomas, Jones, Mahoney, Dukes & Treadway, 2016). In reviewing the work of Gore et al., the power of connectedness for all students is abundantly clear. Students who are able to form connections with other students, teachers and staff, in addition to being actively involved with the school (e.g., extra-curricular activities, attending events and

participation in-class activities) have shown significant, and positive academic results. It should be noted that the aspect of sociability and connectedness is linked to certain Big Five factors of extraversion, agreeableness and neuroticism. The connection between structural barriers, sociability and connectedness, and student success warrants attention within grit ideology (Gorski, 2016).

Some research show that students who tend to be extroverted, able to cooperate and work with others (agreeableness) and, do not see the world as threatening (low neuroticism) tend to experience positive grade outcomes and overall success (Caspi et al., 2006; Noftle & Robins, 2007). While some researchers have made claims that extroverted students tend to experience positive grade outcomes, new research is rethinking introversion is perhaps a more desirable quality. In 2013, Cain released her book *Quiet: The Power of Introverts in a World That Can't Stop Talking*. In her book, she describes the different mindsets, motivation and personality characteristics between extroverted and introverted individuals. Cain claims that while society appears to have linked extroversion to success in different realms, introverted individuals are as likely to be as successful.

In the Nova Scotian context, there is a clear and recognizable disparity in educational success of individuals who self-identify as being of African-descent or Indigenous-ancestry. In the 2016-17 school year, 64% of the student population had reported some sort of self-identification, with 5% of the student population identifying as African-descent and 5% of the student population identifying as having Indigenous-ancestry (N.S. Department of Education and Early Childhood Development, 2017). The examination of the graphs and figures shows clear trends that follow almost similar trajectories to all other students; however, significant, and sizable gaps clearly exist. There are notable exceptions in certain instances where the gap was

significantly narrowed or exceeded grade outcomes among the Indigenous group (e.g., Performance in Math 10 At-Work or Math 10 Academic), and the African-descent group (e.g., Reading performance in English 10).

Labeling and streaming continue to be another problematic issue in the secondary school context for Black Nova Scotian students (Black Learners Advisory Committee, 1994). In the Nova Scotia context, educational inclusion is mandated into law. According to the *Inclusive Education Policy*, students have the right to an equitable and high-quality education that is culturally and linguistically responsive, accepting and respectful in supporting and valuing their learning and diverse abilities (N.S. Department of Education and Early Childhood Development, 2019). In the Nova Scotian classroom, there is the recognition of many different teaching strategies and differentiated approaches to help accommodate a student's diverse needs. Such accommodations are called adaptations and can include a number of strategies such as seating arrangements, increased length of time for assessments or various evaluation techniques. The *Special Education Policy* states:

> When the program planning team has determined that adaptations are not sufficient to address student needs and that the outcomes of the provincially approved curriculum must be changed or additional outcomes need to be developed to meet the needs of the student, the team is responsible for developing an IPP. (N.S. Department of Education and Early Childhood Development, 2008, p. 32)

While the IPP is relevant to promote inclusion when it is warranted (e.g., students with exceptionalities), in some cases there is a perception by some that it is a discriminatory practice. Many post-secondary programs require specific academic level courses and, therefore, do not

recognize an IPP course as an eligible course for entry. For students who wish to continue into post-secondary schooling, this barrier closes future prospects. The Government of Nova Scotia conducted a review of IPPs across its education system and provided a 2016 report called: *Individual Program Plan (IPP) Review: Themes and Recommendations*. Based on statistics from the 2015 school year, 5.7% of students in Nova Scotia had a documented IPP (N.S. Department of Education and Early Childhood Development, 2016). In the summary of findings, the report says:

> In 82% of the IPPs reviewed, it was determined that an IPP was developed at the right point in time in the student's learning and was the most appropriate programming decision to meet the identified learning and social development needs of the student. However, in the case of African Nova Scotian students who self-identified, only 66% of the IPPs reviewed were deemed to be the most appropriate programming option for the student, while 75% of the IPPs reviewed of students of Aboriginal heritage who self-identified were deemed the most appropriate programming option for the student. (p. 9)

Additionally:

> The Minister [of Education] also noted a disproportionately high number of IPPs for students who self-identified as African Nova Scotian or Aboriginal. According to the provincial data: African Nova Scotian students were 1.5 times more likely to have an IPP in at least one subject or programming area than non-African Nova Scotian students; [and], Aboriginal students who self-identified were 1.4 times more likely to have an IPP in at least one subject or programming area than non-Aboriginal students. (p. 5)

Although the Black Learners Advisory Committee (1994) report was released nearly thirty years ago, these recent statistics show very little progress has been made in addressing the systemic barriers around success, thus reaffirming McIntosh's (2005) notion of the invisible knapsack. Students come to school with many diverse needs and various backgrounds, and the deficit ideology as described by Gorski (2016) ignores the structural barriers that many students face. Without addressing the systemic barriers as Gorski describes, how are students able to develop grit and student success?

Income Disparity, Poverty and Family Structures

Educational performance, grit and student success appear to be linked to poverty. Although poverty impacts all students of all different backgrounds, class intersects with race and racialized people are more likely to experience poverty. Therefore, it is not surprising that, in 2017, the Nova Scotia "census [showed] that 67.8% of Arab children, 50.6% of Korean children, and 39.6% of Black children were low-income compared to 20.3% of non-visible minority children" (Frank & Fisher, 2020, p. 20). Acting on behalf of the Canadian Centre for Policy Alternatives (Nova Scotian Office), Frank and Fisher authored the report: *2019 Report Card on Child and Family Poverty in Nova Scotia*. The researchers reported that, "the highest child poverty rates in Nova Scotia are seen in postal areas where higher percentages of African Nova Scotian and Aboriginal children live" (p. 20). This income disparity goes back to McIntosh's (2005) invisible backpack. Students arrived at school with many diverse backgrounds. Some students come to school with a certain set of privileges, whereas other students come to school with few (or none). As a result, the concept of grit, without the consideration of structural inequities, may be flawed (Gorski, 2016).

The wide disparity has trapped Black learners into an endless cycle of poverty. The Black Learners Advisory Committee (1994) states:

> The cycle of poverty and dependence established as a result of these low incomes has important and long-lasting implications for the educational needs of the Black learner in Nova Scotia. Children from homes where incomes are marginal are known to be more likely to have problems related to their health, nutrition, and overall well-being that in turn affect their educational performance. Low incomes limit the ability of families to acquire the best possible education for their children, and access to post-secondary education is difficult, if not impossible. (p. 37)

Family structures are also a major consideration when discussing wealth and poverty in today's homes. Because family resources are finite, having many children in the household often reduces the amount of financial resources available to each child (Radl et al., 2017). This reality is consistent with research by Frank and Fisher (2020):

> Nova Scotia children living in larger families also have higher rates of poverty … the poverty rate for children in families with three or more children was 28.8% in 2017; compared to 26.4% for families with only one child, and 18.3% for families with two children. (p. 25)

For families from a multi-generational household (e.g., grandparents living with children), an increased financial strain occurs (Radl et al., 2017). It is also a common occurrence that children could be raised in lone-parent households. Frank and Fisher (2020) report, "children living in lone-parent families experience a much greater likelihood of living in poverty than

children living in couple families" (p. 24). The researchers also report that, based on data in 2017, more than half (53.1%) of children living in lone-parent families in Nova Scotia lived in low-income households, with 11.4% of children in couple families. 81.3% of lone-parent families in Nova Scotia were also female-led. To further break down the lone-parent households, female-led households had a poverty rate of 48.9% in 2015 compared to 30.4% of children in male-led lone-parent households (Frank & Fisher, 2020).

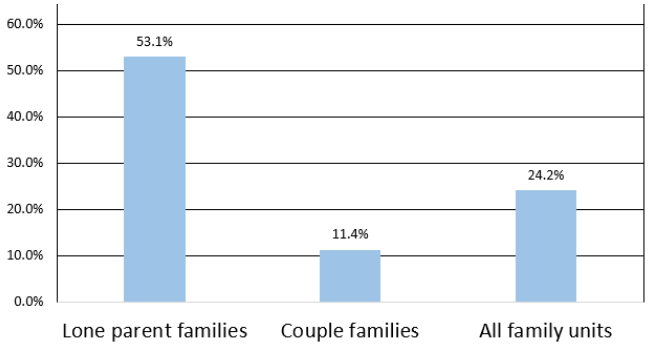

Figure 2. Child poverty rate by family type, Nova Scotia, 2017 (Frank & Fisher, 2020).

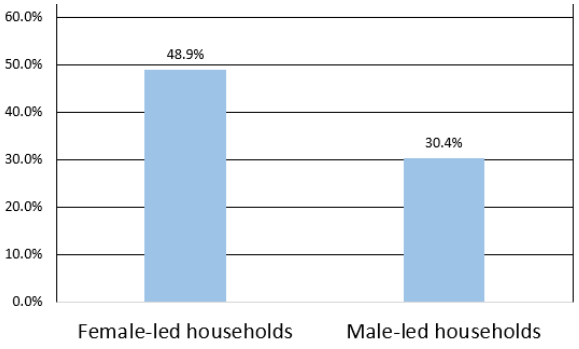

Figure 3. Child poverty rate by female- or male-led households, Nova Scotia, 2017 (Frank & Fisher, 2020).

Conclusion

Since the research regarding grit by Duckworth et al. (2007), grit has received much attention from classroom teachers, educational professionals, policymakers and researchers. It is

a curiosity to wonder whether the construct of grit alone can determine the success of students, or are there additional contexts, situations and factors that impact successful student? This chapter began with an examination of mindsets, entity and incremental theory, and personalities as the internal factors that impact the current understanding of grit and student success. As the chapter continued, deficit and structural ideologies (Gorski, 2016) were discussed, and how such ideologies create another perspective (and disagreement) on the current context of grit ideology. This discussion included systemic barriers for Black, Indigenous and/or people of color (BIPOC), and the discussion around poverty and family structures being items of consideration when examining grit and student success.

Chapter 3: Theoretical Framework and Methodology

I have been teaching for over a decade. During this time, I have witnessed and experienced many different situations, factors and events that contributed to the success of my students. Such situations, factors and events have led me to be reflective in my teaching so that I can help facilitate student achievement. Certain significant moments are my main source of inspiration. However, without deeper understanding, research and insights, I can only proceed so far. Therefore, in moving into the next decade of teaching, I wanted to conduct formalized research to help aid in my understanding of the culture around grit and student success.

Researching the Culture of Grit and Student Success

Epiphanies and Mundane Moments

My journey as a physics teacher has been a vivid array of flashbacks of epiphanic and aesthetic (mundane) moments. Through an autoethnographical lens, I undertook a critical reflection of myself while I wrote and shared first-person personal narratives and stories, which helped me gain insight into the culture of grit and student success that occurred in my high school physics classroom. Undertaking critical reflection is important because, as Hamilton et al. (2008) say, "reflection on practice is required of any teacher and any researcher … [as] reflection plays a vital role in both practice and [the] research process" (p. 25).

Writing and sharing narratives and stories are important because it leads to a more reflective and meaningful life (Adams et al., 2015). Adams et al. demonstrate that autoethnographic stories are stories of an individual's "self through the lens of culture" (p. 1). A culture, as described by Hamilton et al., is a "shared pattern of thoughts, symbols, and actions typical of a particular group" (p. 22). In an educational context, these researchers describe culture as the interpretation of language, actions, and/or interactions. As Adams et al. also

elaborate, the autoethnographic stories provide a medium for those to "interpret personal and cultural experiences" (p. 1) that revolve around individual epiphanies and/or aesthetic moments.

Life experiences can be marked by significant events, and such events can be classified as epiphanic. Denzin (2014) describes an epiphany as transformative moments of revelations that drastically alter the fundamental meanings of an individual's psyche. According to Denzin, such events can be marked as positive experiences or marred as negative ones. Regardless of the type of epiphanies, such experiences "encourage us to explore aspects of our identities, relationships, and communities that, before the incident, we might not have had the occasion or courage to explore" (Adams et al., 2017, p. 7). Therefore, through the opportunity of conducting research, autoethnography, as a research methodology, provided me with the opportunity to critically reflect and understand the culture of grit and student success in my high school physics classroom. It also provided me an opportune chance to understand how certain epiphanic moments critically changed my understanding of what it means to be successful. It is important to note that not all life experiences are epiphanic. Some experiences may be aesthetic in nature. Bolen (2014) describe aesthetic moments as moments of insignificance, in that, it "lacks transformative power" (p. 142).

Positionality

When conducting my research, it was crucial to critically examine my identity and understand how I viewed the world. To note, my positionality is shared in Chapter one through my autobiographical beginnings. The positionality of a researcher is "where one stands in relation to the other" (Merriam, Johnson-Bailey, Lee, Kee, Ntseane & Muhamad, 2001, p. 411); it is important in confronting the perception of inhumane research practices (Adams & Ellis, 2012). Merriam (2009) describes critical reflective examination as reflexivity; it is an important

aspect of positionality. The positionality of a researcher has a direct influence on the research process (Mason-Bish, 2019). Berger (2015) states, "the worldview and background of the researcher affects the way in which [one] constructs the world, uses language, [and] poses questions" (p. 220). Merriam et al. claim the positionality of a researcher is "determined by where one stands in relation to the other" (p. 411). Meriam et al. (2001) note that researchers need to identify whether they are a cultural outsider or cultural insider. They remind us that cultural insiders are individuals whose identities are part of the culture and, as such, they have membership with the culture itself. But individuals who do not have membership with the culture are known as cultural outsiders or strangers.

Two issues are of importance through the identification of a cultural insider and outsider. The first has to do with relational ethics. Adams and Ellis (2012) describe an example where a cultural outsider, who remains objective and impartial, enters a culture. Such objective cultural outsiders may have a perception of exploiting cultural insiders by writing narratives and stories for "personal, monetary, and professional gain" (p. 197), "recklessly leaving" (p. 197) and never being heard from again. As Adams and Ellis show, it is simply unreasonable to have this neutral and objective stance; an autoethnographer's shared membership helps alleviate this perceived exploitation with cultural insiders by valuing relational ethics.

The second issue has to do with the responses given from cultural insiders. A cultural outsider who interviews a cultural insider may respond differently than if both belong to the same culture (Adams et al., 2015; Berger, 2015). Berger discusses the many advantages a researcher has when they have shared language and membership with the subject. This includes accessibility and rapport. Therefore, a researcher who is a cultural outsider may make different observations and interpretations of insider culture because they lack the subtly and understanding

of certain cultural nuances. This ultimately impacts the interpretation of narratives, phenomenon, and stories.

Introduction to the Approach

In embracing an autoethnographical lens, one needs to understand the components that comprise autoethnography. Adams et al. (2017) describe autoethnography as:

> A research method that uses personal experience (‘auto’) to describe and interpret (‘graphy’) cultural texts, experiences, and practices (‘ethno’). Autoethnographers believe that personal experience is infused with political/cultural norms and expectations, and they engage in rigorous self-reflection—typically referred to as ‘reflexivity’—in order to identify and interrogate the intersections between the self and social life. (p. 1)

Autoethnography originated as a merger of both autobiography and ethnography (Adams & Ellis, 2012). According to Adams and Ellis, when an individual writes an autobiography, they retrospectively select and write past stories, assembled using a recollection of memories. Adams and Ellis describe an ethnographer as one that enters a defined culture for an extended amount of time. Such ethnographers use their observations and experiences, such as “repeated feelings, stories and happenings” (p. 201), to write a thick and vivid description of a culture (Geertz, 1973). Then, ethnographers often connect their experiences and findings to formalized research. Ultimately, as Adams and Ellis describe, ethnography aims to describe the cultural practices happening within an insider culture so that it becomes familiar to the cultural outsiders, such that it provides “readers [with] a sense of being there in the experience” (p. 3).

Because autoethnography acts as an intersection between autobiography and ethnography, it provides a medium for a researcher/subject to draw upon their own experience,

story and self-narrative (Savin-Baden & Major, 2013), and to critically reflect on oneself in the context of a culture (Adams et al., 2015). These researchers claim, "Autoethnography is a method that allows us to reconsider how we think, how we do research and maintain our relationships, and how we live" (p. 8).

Narrative inquiries, self-studies, and autoethnographies are similar to each other, however there is a blurring of boundaries between the three methodologies (Hamilton et al., 2008). Hamilton et al. suggest, "Labeling work as narrative or self-study or autoethnography depends on who engages in the study and who writes about it" (p. 18). In a self-study, the focal point is the pursuit of better knowledge in a particular practice (Hamilton et al., 2008). Although it was an indirect goal of mine to improve my teaching practice and facilitate success for students, it was not the main reason for conducting this research. I wished to explore and understand the culture around grit and student success. Therefore, self-studies lacked the required ethnographic component. Hamilton et al. state:

> While narrative may be used in all three approaches, not all narrative inquiries or self-studies are autoethnographic because they do not necessarily focus on the cultural impact of the work itself. When a self-study involves social or cultural issues, it could fit the definition of autoethnography. (p. 25)

Autoethnography is partially identified by its examination of culture; "without an easily identifiable cultural component, a study cannot be called an autoethnography" (Hamilton et al., 2008, p. 22). An autoethnographic researcher needs to "expand and open up a wider lens on the world" (Ellis, Adams & Bochner, 2011, p. 275), bringing into focus "the social and cultural aspects of the personal" (Hamilton et al., 2008, p. 24), and use "personal experience to illustrate

facets of cultural experience … [to] make characteristics of a culture familiar for insiders and outsiders" (Ellis et al., 2011, p. 276).

Adams et al. (2015) use the term inside-out to help autoethnographers start their research. Often, autoethnographers start with the events that impacted their "thinking, feelings, sense of self and the world" (p. 47). Such events, or epiphanies are from personal experiences, in the presence of others (Denzin, 2014). Writing such experiences into narratives and stories, and critically reflecting and interpreting such events can lead to a deeper understanding of the culture (Adams et al., 2015). This noble pursuit links the personal, cultural, and political issues and dilemmas within a cultural context, with the researcher being the object of investigation (Ellis et al., 2011).

Qualitative Research

As a physics and mathematics teacher, my entire discipline has been steeped in quantitative design. The quantitative paradigm comes out of the positivist tradition. It has been widely used in sciences and for the longest time, it had the centre stage as being the gold standard for research (Denzin & Lincoln, 2011). Both quantitative and qualitative paradigms have merit for answering different questions. For example, in testing the effectiveness of different vaccines, a large statistical trial is run to answer, "To what extent does a vaccine impact the immunity of human participants?" As a result, quantitative methodologies examines large trends and patterns in data. While quantitative research methods lean on hypothesis testing and statistical treatments of data, qualitative research methods focus on answering the how and why questions (Merriam, 2009) related to how a participant makes sense of a phenomenon through the use of thick and vivid description of a culture (Geertz, 1973). Through this process, one can obtain a deeper understanding of the phenomena at hand. As Adams et al. (2015) explain,

"Social life is messy, uncertain, and emotional. If our desire is to research social life, then we must embrace a research method that … acknowledges and accommodates such mess and chaos, uncertainty, and emotion" (p. 9). Therefore, having determined my research topic, I turned to qualitative methodologies to learn and understand the phenomenon related to grit and student success in a high school physics classroom.

Understanding Autoethnography

Autoethnography is a qualitative research methodology. Denzin and Lincoln (2011) describe qualitative research as "a set of interpretive, material practices that make the world visible. These practices [are transformative]. They turn the world into a series of representations, including fieldnotes, interviews, conversations, photographs, recordings, and memos to the self" (p. 3). -When autoethnographers conduct research using personal experiences, autoethnographers attempt to "critique, make contributions to, and/or extend existing research and theories" (Adams et al., 2015, p. 36). Such attempts help complement and fill the gap in the existing research. The complex, insider accounts given by autoethnographers allow outsiders an opportunity to learn "how [and] why particular experiences are challenging, important, and/or transformative" (Adams et al., 2015, p. 27).

Autoethnography provides a medium for those who were denied an opportunity to speak (Denzin, 2014). Ellis et al. (2011) note, "autoethnography is one of the approaches that acknowledges and accommodates subjectivity, emotionality, and the researcher's influence on research, rather than hiding from these matters or assuming they don't exist" (p. 274). Fundamentally, autoethnography aims to "make research accessible to multiple audiences" (Adams et al., 2015, p. 36). Autoethnography comes as a way of being inclusive, engaging, and understanding of others as "such techniques make research more valuable" (Adams et al., 2015,

p. 42) by being "able to reach wider and more diverse mass audiences that traditional research usually disregards" (Ellis et al., 2011, p. 277).

Finally, autoethnography engages the researcher to "embrace vulnerability as a way to understand emotions and improve social life" (Adams et al., 2015, p. 36). Speaking through a critical lens, as a visible minority Asian-Canadian educator, I am often left with a definite uncomfortable sense of vulnerability. What the dominant, Westernized society views and values as important, may be different than the Eastern culture I was born into. This is the positionality I often confront. In my experience, my interpretations with Western-born educators sometimes differ and, as a result, are considered unimportant and/or undervalued. Adams et al. (2015) say, "By telling stories—often vulnerable stories—about aspects of our identities and experiences, autoethnographers purposely open themselves up to criticism" (p. 40). But, it is through such criticism and confrontation of uncomfortable stories that lead others to further learning and understanding (Adams et al., 2015).

Data Collection

In a nutshell, I, as the researcher, was the primary instrument in data collection (Savin-Baden & Major, 2013). Adams and Ellis (2012) say, "the [researcher] retrospectively and selectively writes about meaningful experiences—epiphanies—that are made possible by being part of a culture and from possessing a particular cultural identity [positionality)]" (p. 199). In my research, I looked back and drew upon three past epiphanic moments, as these experiences not only continue to inspire me but drastically altered my understanding of the culture of grit and student success. I shared my personal narratives in terms of a story. Later in this chapter, I explain why I chose these three students.

Personal narratives and stories serve a purpose. Adams and Ellis (2012) describe personal narratives as a way of understanding an individual's self while situated in a cultural context. In order to engage readers and create a sense of "being there in the moment" (Adams & Ellis, 2012, p. 3), I utilize Geertz (1973) notion of 'thick description.' Geertz describes an example between three children making different eye movements: a twitch, wink, and blink. "All three [eye movements] look similar, but their meanings are vastly different and are only understood within a broader cultural context" (Riemer, 2012, p. 165). Providing thick descriptions goes beyond merely describing an event but goes a step further. It is a cultural interpretation (Riemer, 2012). This thick description helps build a sense verisimilitude by promoting deeper understanding of the experiences and stories told (Adams et al., 2015).

When providing thick and vivid descriptions, as suggested by Geertz (1973), I use Denzin's (2014) structure of a story. Although other authors such as Labov (2003) provide similar story structures, Denzin's approach is the least complex and most straightforward. In a story, people (subjects) are depicted as characters that are embedded in a location or context in which the story occurs. A dramatic tension, epiphany, or crisis occurs which the story revolves around. Denzin describes a crisis as "a turning point in [a] person's life" (p. 32). A sequence of events occurs which leads to a point or moral of a story. The moral of the story gives meanings to the experience(s) that occurred. No one story is a singular story. A narrative is filled with multiple stories (Denzin, 2014). In the data collection phase, I presented my narratives and stories around each character before any data analysis was conducted. That way, each story follows Denzin's elements.

Prior to choosing the three epiphanic moments for my research, I gathered old artifacts such as email correspondences, photographs, written letters, gifts and cards, and reflected on and

journaled these experiences into thick and vivid descriptions within the stories I wrote. Certain artifacts were thought provoking. It brought me back to the moment I came into possession of the artifacts. Holding these mementos brought back many memories. Such moments came directly into plain view, and I wrote stories to describe my actions prior to receiving these artifacts, the feelings I had in the moment and what occurred shortly thereafter. Through the use of artifacts, I was able to write the reflective stories that occurred for each student.

While some stories were summarized into a few paragraphs, other stories were quite lengthy and left me with more questions than answers. Choosing the three stories was not a random act. Over the decade of teaching, some experiences with students varied from mundane to those that were epiphanic and transformative. Even after years of teaching certain students, the epiphanic and transformative stories continued to linger in my mind and were left unresolved. Some stories with students were filled with moments of joy, other experiences were wrought with difficulty and tension, and others led me to reflect on what it means to be successful.

Due to the hustle and bustle of teaching, I never had the opportunity to put such lingering thoughts to some meaningful conclusion. Through the research process using autoethnography, I was given an opportunity to critically understand how certain events and experiences significantly transformed my thinking and how it resonated in my life. After much reflection and back and forth, I ultimately chose three students who had the most impact and transformation on me. Such students (with pseudonyms) are Caleb, Adhira and Violet.

My experiences with Caleb had the most negative impact on my life. I taught Caleb for two years and, during those years, it was likely one of the most difficult experiences I faced as an educator. Caleb was a challenging student. He came from a poor, single-family household. Through the daily behavioural issues and challenges, I often butted heads with him. Every day

was a challenge and often I felt let down because many of my interventions resulted in failure. At some point, I gave up on him and that was a difficult thing for me to do. However, when there is adversity, there is opportunity. During the height of the COVID-19 lockdown, he slowly progressed and, each day, worked very hard to be successful. He made it a point to overcome all odds and adversities in his life and, as a result, significantly turned around and ended up far exceeding his original goal of simply passing. What led him to this turnaround was important to my understanding of success.

In the past decade, I have taught many first- and second-generation Canadians. While many students have come and gone, I chose Adhira because her upbringing resembled a striking similarity to mine. Adhira was a very hard-working and determined student. She appeared to have all the qualities of being a gritty student. Although she experienced a significant degree of success, her success was tied to her parents. At some point in Adhira's Grade 12 year, Adhira's grades started to drop. She missed several classes, was inattentive in class and often displayed a lack of focus on certain tasks. At the time, I thought it was a behavioural choice to succeed with the minimal amount of effort. However, that was not the case. For Adhira, it was her role as a translator, advocator and support person to her parents that I did not consider. The structural inequities that impacted Adhira left me with many unanswered questions and I chose her story as part of the autoethnography.

Finally, parental expectations, students' mindsets and the relationships developed between the child, teacher and school have very profound impacts on student success. Out of all the students I have taught in my life, Violet showed me what being gritty truly is. When Violet first came into my class, she appeared to have many signs opposite to grit. While she tried her best to be successful, she appeared to demonstrate many neurotic traits. Violet's self-defeating

words and attitudes sometimes caused her to experience major setbacks. It was not intentional for her to have these self-defeating attitudes but they appeared to be a combination of previous traumatic experiences in similar mathematics-based courses in addition to possible unrealistic parental expectations that contributed into her negative sense of self. It was not necessarily changing Violet's mindset and beliefs that contributed to Violet's success. It was also changing Violet's mother's mindset and beliefs around success that ultimately led to Violet becoming one of my very top Grade 12 physics students. Therefore, a major part of my understanding of grit and student success came from Violet. Her difficult journey and her turnaround was something that, to this day, brings so much comfort to me. Therefore, having Violet as part of my autoethnography was a very easy choice.

Data Analysis and Interpretation

Data interpretation and analysis can be a difficult and confusing part of the research process because it is difficult to "identify a precise set of processes that underlies it, as well as to follow a specific set of steps to achieve it" (Savin-Baden & Major, 2013, p. 451). The terms interpretation and analysis can often be confused as some may use them interchangeably. Savin-Baden and Major define analysis as the breaking apart of data to produce themes, while interpretation is the translation of themes and the uncovering of meanings.

Adams et al. (2015) say, "it may be helpful to begin the work of interpretation and analysis by creating themes for the ideas, interactions, and insights that you have generated in the field" (p. 66). Therefore, I started this process by developing different themes that may have arisen from the analysis. These themes may include motivation, racial tensions, perseverance, passion and family structures, to name a few. No one story is a singular one, as "narratives [are] filled with multiple stories, stories within stories" (Adams & Ellis, 2012, p. 54).

The literature review acted as the foundation to how I interpreted my data. Autoethnographers typically interpret their experiences by connecting their narratives and stories to the existing research and, in doing so, "use their academic training to interrogate the meaning of an experience" (Adams & Ellis, 2012, p. 199). Although the literature review acted as a guide to frame interpretations, "the key is to ensure that these frameworks do not force interpretations but [merely] serves as a way to view them" (Savin-Baden & Major, 2013, p. 457). It was an important goal of mine to see how my autoethnography contributed to, critiqued, and extended current research. By connecting the literature review to my themes drawn from personal narratives and stories, I could determine whether "theory supports, elaborates, and/or contradicts personal experience … [and whether it] provides a foundation on which to elaborate or provide a counter narrative to the meanings and implications" (Adams, Jones & Ellis, 2015, p. 94) involved.

Credibility and Quality

In quantitative research, validity and reliability has been the standard for demonstrating the quality of process (Savin-Baden & Major, 2013). Validity refers to a researcher being "able to lay claims to the strength of their findings [and] to demonstrate that [their findings] are true" (Savin-Baden & Major, p. 473). Savin-Baden and Major believe, "Reliability suggests that measurements should be consistent and repeatable … an instrument should measure the same thing each time it is used with the same subjects in similar conditions" (p. 473). Denzin (2014) suggests, "[Auto-ethnographic] researchers must establish the criteria of truth that operates in the group that are studied … [as] it will be these criteria that structure the stories that are told" (p. 59).

The criteria of truth from Denzin (2014) requires establishing reliable ways to assess the autoethnographer's credibility. Bochner (as cited in Adams & Ellis, 2012) provides several clarifying questions when assessing an autoethnographer's credibility:

> Could the author have had the experiences described given available evidence? Does the author believe that this is actually what happened to her or him? And has the author taken literary license to the point that the story is better viewed as fiction rather than as a truthful, historically accurate moment? (p. 207)

The believability of an autoethnographic story can be maximized by establishing verisimilitude, which "evokes in readers a feeling that the experience described is lifelike, believable, and possible, a feeling that what has been represented could be true" (Ellis et al., 2011, p. 282). To reinforce the believability of the provided narratives, Fisher (1987) believes, "Human communication is tested against the principles of narrative probability (coherence) and [narrative] fidelity (truthfulness and reliability)" (p. 15). Coherence in an autoethnographic story "depends on the reliability of [the] characters" (p. 16) such that characters need to behave with a sense of predictability (Fisher, 1987). Fisher says:

> Character may be considered an organized set of actional tendencies. If these tendencies contradict one another, change significantly, or alter in strange ways, the result is a questioning of character. Coherence in life and in literature requires that characters behave characteristically. Without this kind of predictability, there is no trust, no community, [and] no rational order. (p. 16)

Although generalizability is a quantitative term, it can be used in qualitative methodology to promote the criteria of truth (Ellis et al., 2011). Generalizability helps establish the link to Fisher's (1987) narrative fidelity. This is because narrative fidelity depends on "whether or not the stories [readers] experience ring true in their lives" (p. 18). This is evidenced by "assessing how well an [autoethnographic story] applies to and is relevant for readers, how well a story speaks to them about their experiences or about the lives of others they know" (Adams & Ellis, 2012, p. 207).

Ultimately, when we engage in reflective practices, we cannot make claims of accuracy. All we can do is offer verisimilitude (Feldman, 2003). This verisimilitude is due to our positionality because the knowledge we share, the understandings we give and the insights we have are "flawed because it is based on a distortion of the world" (Feldman, 2003, p. 27). Good narratives convince readers to come closer to discovering plausible truths (Savin-Baden & Major, 2013) and all we can really do is maximize our credibility through the criteria of the truth we establish.

Ethical Considerations

It is important as a researcher that I am always acting with integrity throughout the entire research process. As Merriam (2009) says, one needs to be "conscious of the ethical issues that pervade the research process and to examine his or her own philosophical orientations" (p. 235). It is evident that I, as an autoethnographer, do not exist isolated from others. I still maintain shared membership with the school culture and relational ethics is always at the top of my mind. But most importantly, I do not treat and consider the students in my narratives as "impersonal subjects only to be mined for data" (Adams & Ellis, 2012, p. 206).

In autoethnographic narratives, whenever I share stories of other individuals, I must provide those connected individuals with an opportunity to review my stories, acknowledge how they feel and be able to respond to what I have represented (Ellis et al., 2011). At the time of writing this, I have been teaching for over a decade. As such, I have taught at a total of nine different schools. All nine schools are high schools in the secondary context. In sharing my epiphanic narratives and stories, it might not be possible or feasible to share stories with those individuals in my stories because such individual students have either graduated and/or have been disconnected from me for a very long time. Adams et al., (2015) recognize this infeasibility with relational ethics by stating:

> There is no singular or prescriptive set of rules for determining when and how we share our work. Each case should be considered on its own—and researchers must account for both the goals and potential consequences of a project. (p. 62)

Ellis et al. (2011) navigates the issue of relational ethics through the use of pseudonyms. When I bring others into my stories, autoethnographers have to also "protect the privacy and safety of others by altering identifying characteristics such as circumstance, topics discussed, or characteristics like race, gender, name, places, or appearance" (Ellis et al., 2011, p. 282). Adams et al. (2015) say, "revealing such information about persons, events, and/or sites might thus inflict harm on others" (p. 60).

Since starting my teaching practice fourteen years ago, I have taught at eight different high schools across Nova Scotia with each school serving a different community. Each community had different values, cultures and demographics. In order to truly capture the essence of the culture of grit and student success, I believe it requires the recognition of individual

students' backgrounds such as, gender, race and ethnicity. To remove such characteristics will remove much of the in-depth understanding I am trying to uncover. Due to the length of time I have been teaching, the number of schools I have been at and, only sharing three of my most epiphanic moments, I believe it is still possible to keep those individual students in my stories hidden and anonymous. To enhance confidentiality, I will keep the names of individual students and their location of events confidential.

Finally, the intention of this autoethnography is to "critique, make contributions to, and/or extend existing research and theories" (Adams et al., 2015, p. 36). As shared previously, a cultural outsider, such as an ethnographer, would enter an unfamiliar cultural setting, establish rapport with cultural insiders, make observations and do fieldwork and then leave the culture (Adams & Ellis, 2012). According to Adams and Ellis, such outsiders may have the perception of exploitation as they often write narratives and stories for personal and/or financial gain. Adams et al. claim:

> Researchers eventually came to understand [that] such practices [are] unethical and incomplete. The researchers took advantage of often-vulnerable others—and … their representations of these others often were incomplete because they omitted the ethnographer's history of, presence among, and experience with others, as well as the ethnographer's decisions in recording and representing them. (p. 11)

My interpretation of Adams et al. (2015) is that, without valuing the positionality of a researcher and their relational ethics with those they study, such research is unethical and incomplete. I have shared membership with the characters in my stories. I am still an active teacher, I still continue teaching and my reasoning for conducting autoethnography is not for

selfish reasons. My reason for conducting autoethnography is to provide a medium for disregarded and neglected voices (Adams et al.), to provide a deeper and different perspective on grit and student success and to bring some closure to the lingering questions I had with the three chosen students in my autoethnographic stories.

Conclusion

Autoethnography is a method that humanizes research by focusing on the complexities of life, showing readers that both the author, the researcher and those who are implicated, the characters, also matter (Adams et al., 2017). Autoethnography values the narratives, relationships and stories made between the self and implicated individuals (Adams & Ellis, 2012). If a researcher's task is "to study the social lives of humans, then [the researcher] cannot relegate elements of human lives or experiences to the periphery" (p. 8).

I was the primary instrument in data collection in this study. I attempted to write thick and vivid narrative stories (Geertz, 1973) about three past epiphanic moments that significantly and drastically altered my view on grit and student success. The writing has been separated by character and utilized Denzin (2014)'s structure of a story. Once the three narrative stories were completed, I analyzed my stories by breaking them into different themes. In using the literature review as a guide to frame interpretations, I interrogated the meaning of the given experiences (Savin-Baden & Major, 2013; Adams & Ellis, 2012). By doing so, I have contributed, critiqued and extended the current understanding of grit and student success.

Chapter 4: Grit and Student Success in a High School Physics Classroom

In the Heat of the Summer - Reflections on my practice

Echoes of the Coming School Year

It all starts in early August, near the midpoint of summer. As I am outside enjoying my summer vacation, I turn on the radio and I listen to the local news. Suddenly, I hear the earliest indication that school is about to start back up; “Back to school specials are now on. Beat the lines and the chaos. Spent $50 and get $10 off. Come and check out your local Staples store for more details.” I choose to ignore the commercial and chuckle to myself; “Meh, I just started summer. This is a next week problem.” As the week goes on, I am constantly bombarded with further reminders of school starting back up. This included clothing store specials, to the latest deals on electronics and to seeing fliers promoting back-to-school specials.

I do not want others to think that I do not love my job. I love what I do. I love seeing the students’ faces each day. I enjoy helping students, nurturing their abilities and building their confidence. It is my philosophical belief that if students know I support them, they will always do their utmost to support me. They will always try their best to make me proud and this has always been a cornerstone of maximizing chances of student success in my class.

But, along with all the positives that go along with my job, there are some negatives including workplace politics, the endless piles of marking, a lack of preparation time to do countless tasks, and the constant demands and legal expectations from external stakeholders (e.g., parents, guardians and the local government). However, my duty and focus has always been to sacrifice much of my time towards helping students. As such, I am also bombarded with listening to the social, racial, mental and familial stories and burdens that some students face.

To remedy the negatives for my students, I always keep an open-door policy with my classroom. As such, students frequently come and talk to me about what is going on in their lives. They often share their hobbies, interests and, at times, their troubles. Often, these troubles are minor. They include difficulties with friends, a disagreement with another teacher, help with homework or issues involving pathways to university, colleges, and careers. Such minor difficulties are easily solved with coaching and mentorship. It is also important that students do not need to feel obliged to tell me everything. There is no judgment. All I care about is their health and happiness. I want them to know that I will do my utmost to support them. Therefore, it has always been important to me to keep my classroom door open during the school day. My classroom is a safe spot for all students to be. It does not matter if they are currently my students. They generally know they can just come in and are in a safe zone.

As great as it is to keep myself connected with students, there is an emotional taxing component that goes along with such involvement. I am hesitant to share this story but, once people know this story, it justifies the very reason why I need my summertime off. Years ago, I taught a student who I will call Denver. At this point, Denver was no longer a student of mine. He recently graduated. Like many academically inclined students, Denver had career goals from the outset of high school. Denver had many good friends, a strong social connection, was internally motivated, involved with many clubs and activities, had a part-time job, and had a great family foundation. I never had any concerns regarding Denver. For the three school years teaching Denver, I thoroughly enjoyed every moment. Daily, Denver would often gather all his friends at lunch time, in my classroom. This resulted in a large social club for Denver and his friends. Most of his friends, at all grade levels, would also be eventual students in my classes.

One evening, I was scrolling through a social media news site, which shared local community news and events. On that very evening, I saw a post regarding one of our commuter traffic routes being closed. To protect the identities of the victims involved, I purposely chose to be vague in sharing specific details. However, needless to say, this traffic location was frequented by victims choosing to end their lives. In that moment I scrolled to the next post without dwelling on what I saw.

Several hours went by, and some of my students reached out to me regarding Denver. Because of Denver's large social connections at many grade levels, some of his friends were current students of mine. Some of my past and current students reached out to me via email regarding Denver. Through I normally avoided emails in the evenings, I noticed a frequency of emails arriving in my inbox and I decided to check. Shock came to me as I read one email after the next. Students did not explicitly use the word suicide. However, based on the emails, the facts based on the social media news site and the messaging from all my students aligned. I did not respond to students. I did not know what to do. I felt so much shock and dismay. Could this be a different Denver? Is this a bad dream? I could not speak to my own family because they would not be able to help or understand. And I did not want to drop a bombshell on my colleagues in the middle of the night. I remember not being able to sleep that night. I felt a profound sadness that one of my very best students had passed away. I thought to myself, was I oblivious to whatever was going on in Denver's life that I could have prevented his death? Should I have reached out to him more frequently? Could I have done something differently?

The time for self-doubt and self-loathing was not now. You see, at my very core, my philosophical belief is to always put my students first. After a few more hours of lying in bed and reflecting on what had happened, I ultimately decided to compartmentalize my feelings and find

out ways to support the students who were close to Denver. I recall at Denver's wake that many students were still visibly upset. There was a lot of crying. But, there were students who were still in shock. In their young lives, they probably have not had much experience with death. In listening to the students' stories and their own self-doubt for not being able to help Denver, I also listened and comforted them on their emotional pain. I attempted to put on a strong face to support my students. I remember going home with profound sadness, loss and doubt. Some of my colleagues who also attended Denver's wake suggested that I take the next few school days off. I reflected on that option. I thought to myself that, if I worked and kept busy, I would not have to dwell on my thoughts. At the very least, if I was in school, I could help and be a support mechanism for some. Eventually, I would have more time off to heal and reflect on the past year's events.

The story regarding Denver is one of the most difficult moments of my career. Even with Denver's passing, I, without hesitancy, will continue to be a strong support mechanism for my students. In my eyes, much of the success that has occurred in my classroom can be attributed to that overwhelming support, understanding and cooperation between my students and me. Therefore, with all the hectic hustle and bustle, summertime off is my opportunity to focus on myself, and find pathways and opportunities to heal. Such opportunities include exercise, travelling, getting reacquainted with hobbies, spending time with friends, and reading the latest research on education and practice. To me, these are joyous times. I finally have a time to put the focus back onto me. Hence, my summertime off is my opportunity to recuperate mentally and physically.

Getting Back into the Grind

It is finally mid-to-late August and, at this point, I feel mostly rejuvenated and ready to slowly reacclimatize to school norms. When I first started teaching, I would spend countless hours throughout the summer planning for my new courses. However, now that I am in my mid-career and I am teaching similar courses every year, it is all about finessing the upcoming courses, creating new activities and revising my materials to ensure my physics courses have the most up-to-date materials. It is also a time for me to critically reflect on how I can make physics be an equitable course for all students of all abilities. Ultimately, I digress. My other reason for slowly reacclimatizing myself to school norms is so that, when September arrives, it is not a shock to the system to wake up at six in the morning and be working eight to ten hour days.

Traditionally, physics has a perception of being elitist. I say this because, when people think about physics, it conjures up famous and brilliant physicists such as Albert Einstein, Isaac Newton, Stephen Hawking and Marie Curie. It may also conjure the perception of higher-level mathematics ability, and the ability to solve increasingly difficult and complex problems. Simply put, the perception around physics is that, unless you are the best and brightest, you should not take physics. A few years ago, I tried to get a Black student named Treyvon into my class. I met Treyvon through his participation in school events and through his association with other students in my classes. Treyvon had an amazing personality; he was friendly with others, had a good work ethic, was involved with the school and local community, and was a definite leader in his own right.

I had reached out to Treyvon and asked him whether he would consider taking Physics 11 with me. His answer was jokingly, “No.” At the time, I thought he was just unsure of himself. Perhaps he was not confident in his abilities, hence his reaction. I also believe Treyvon thought it

was a joke, but I was completely serious. As I tried to reassure Treyvon by expressing my belief in many of his excellent leadership traits and amazing abilities, his demeanour changed from a joking attitude to a more serious stance. As I looked at Treyvon's body language, his shoulders straightened up. Treyvon's eyes were focused on mine and he was no longer smiling. Ultimately, in a more serious but respectful tone, Treyvon ultimately reaffirmed his initial decision and said that he will not be taking physics.

A few days went by and I was still determined in getting Treyvon to take physics. I reflected on my experience with Treyvon and I felt that he had tremendous potential and I did not want to give up on a student. I decided to reach out to his mother, Irene. My reasoning for seeking out Treyvon was two-fold: (1) I felt that, since he had all these wonderful qualities, was involved with sport, and was a school leader, that taking physics may open more opportunities for him after high school; (2) In my own experience teaching physics, it is typically a course that generally does not enrol many Black students. At the schools I have worked at, roughly 10% of the school population identified themselves as Black. Therefore, in speaking about an equitable classroom, the average school classroom should be reflective of the school demographic. As a person of colour, I am always conscious about equity and, therefore, if I believe students like Treyvon can do it, I will make the concerted effort and try.

In calling Irene, I introduced myself as one of Treyvon's teachers, I recall a sudden pause on the telephone line. The pause was as if someone either hung up or placed me on pause. It was just silence. In my experience, some parents are apprehensive when a teacher calls. Sometimes, the telephone conversations are about bad topics (e.g., disciplinary issues, poor academics and repeated absenteeism). Therefore, parents who pick up the phone are a little defensive. After a pause that felt like eternity, I said to Irene that this phone call is not a negative conversation

regarding Treyvon. I immediately noticed a more relaxed tone. As we spoke, she wondered why I called. I asked her for her help in recruiting Treyvon into Physics 11 for the following school year.

Just like Treyvon, Irene jokingly chuckled on the phone. The notion of Treyvon taking physics was amusing to her. She could not believe I even suggested it. Although I did not hear a disrespectful tone or attitude from Irene, I believed she thought it was some sort of prank because we, as educators, have consciously and sometimes unconsciously constructed a narrative around physics as being an elite course and, as such, typically did not have Black students in the class. There was the perception that only the best and brightest took physics. I reassuringly reaffirmed my reasoning to why I believed Treyvon would be a terrific candidate by listing all his terrific character traits, leadership potential and potential future pathways after high school. As Irene continued to laugh, she thanked me for the telephone call and concluded that she does not think Treyvon will take physics.

In the end, Treyvon did not sign up for physics. In retrospect, I do not believe there was much more I could have done to get Treyvon to join. It is a sad thing trying to overcome the structural issues that prevent students from taking physics, especially Black students. I was not going to beat myself up for failing. I wanted to come to terms as to why Irene did not appear to support me in recruiting Treyvon. I reflected and continued to ponder on this pivotal moment. By the time Treyvon reached Grade 11, he may have had years where the messaging from external sources impacted his perception of being physics bright. This could have arisen by the lack of Black people represented in movies and TV shows as scientists. He could have gotten different messages from different places such as friends, family, community, social media and some other adults about taking classes such as physics. He could have noticed that there were not many

Black students represented in physics classes. Additionally, the negative impacts of streaming, where the system tells you what you could or could not do, based on the courses and grades presented thus far could have been a factor. Overall, without directly asking, I can only speculate as to some of the potential causes.

Preconceived Notions of Physics

The cornerstone of success in my class starts with carefully and deliberately putting the systems and structures in place to ensure the greatest amount of success in my class. Each year, during the summertime, I am envisioning what it means to be successful in my classroom. I carefully examine the three corners of success. These include topics involving assessment, classroom management and classroom structures. The systems that I have in place are what guides students to traditional routines and practices that lead to a maximum chance of success. It is also important to me to critically reflect on what happened in the previous school year, implement things that worked well and find strategies to mitigate negative events.

Students entering Physics 11 may have preconceived notions of what physics entails. Their point of origin for such thoughts mainly comes from Science 10, a course which all students require when graduating from high school. In the Nova Scotia Science 10 curriculum, students are taught four specific and well-defined units: Chemistry, Ecology, Weather and Motion. Although the Motion unit of Science 10 is technically not actual physics, it forms the basis of the first unit of Physics 11. Therefore, it takes a de facto role of what physics may be perceived as. Some teachers also refer to the Motion unit as physics and, therefore, students believe the Motion unit is indeed physics.

Prior to full-time physics teaching, I taught Science 10 for many years. I continue to do so, but in a minor role. As interesting as Science 10 is for students who have not chosen their

educational pathways, the outcomes in the Motion unit are often restricted to graphing, basic labs involving uniform and non-uniform motion, and solving mathematical problems involving the concepts of displacement, time, velocity and acceleration. In my opinion, it is the most boring unit of Science 10 because there is a lot more to physics than what is often presented. In my experience in teaching Grade 10 sciences, students often arrive with a diverse level of mathematical abilities. While some students arrive with a strong degree of mathematical ability, other students struggle with general mathematics. Therefore, if I choose to teach the content with an immediate emphasis on concepts using algebra, I may cause disengagement with students who already struggle with mathematics. Additionally, if I do not create activities that allow students to buy in, the students may continue to resent the topic and further disengage. As a result, creating engaging and hands-on experiences that involve the concepts related to the outcomes for Science 10 is often a difficult balancing act.

The Context of Teaching High School Courses

In my role as a Science 10 teacher, the Chemistry, Ecology and Weather units offer engaging curriculum and hands-on activities that are reflective of the 'coolness' of their similarly prospective Grade 11 classes. Such classes include Chemistry 11, Biology 11 and Oceans 11. In my attempt to make the Science 10's Motion unit a bit more interesting by adding computer technologies to the labs, and including more hands-on and relevant activities, I am sometimes met with resistance from some teachers. Most Science 10 teachers I have worked with come from a chemistry, biology and/or oceanography background. As such, some are often uncomfortable with the physics curriculum, as such content is outside their comfort zone.

Because Science 10 is a general but required course for graduation, there is a diversity of students with a wide range of academic abilities and motivation levels. For those who have been

less successful academically in science education, the Motion and Chemistry units, in particular, act as a systemic barrier for high school achievement. For instance, in the many high schools I have been at, the four units of Grade 10 science are weighted equally. Students who perform poorly in both the Chemistry and Motion units are much more likely to fail than those who do poorly at one unit. As a result, my fellow colleagues who teach Science 10 are often working collaboratively to examine and understand how to minimize the chances of students failing.

In some of the discussions I have had with teachers, there is a socially constructed belief that physics is often taught to students who are often bright, keen and know their pathways for the future. Such students are enrolling to satisfy an admission requirement for community college or university. Some students take it because their parent(s) or guardian(s) want them to take it. Or, some students choose to take it because they enjoyed the Science 10's Motion unit and wish to continue learning it further. Due to these socially constructed beliefs, it was decided by some that we should teach the Motion unit with the least number of barriers possible. This is because, for those who plan to continue to enrol in physics, they can be taught the correct approach at a later point. It ultimately meant that we should modify our approaches, even if the method taught is somewhat incorrect at the higher grades.

An example of the lessening of barriers around the Motion unit was to address students with poor mathematical abilities. Instead of re-teaching basic algebraic skills due to the limited number of class hours available, Grade 10 science teachers would modify the teaching approach to reduce algebraic manipulation of variables. For example, there are many equations that describe the connections between changes in position, velocity, time and acceleration. These equations are known as the kinematic equations. Normally, in Grade 11 physics, students are given an equation and students manipulate the equations utilizing algebraic skills to solve for a

variable. However, to address the gaps related to Grade 10 students' poor algebraic skills, teachers give an equation that immediately solves for a variable. All students need to do is input a number into the equation, do some basic mathematical calculations, and the calculation yields a desired result.

While this approach allows students to solve for specific variables, this is not the correct curriculum approach when solving for problems in Grade 11 or 12 physics. In fact, due to the many different possibilities that occur in life, by teaching students using this plug-and-solve approach in Grade 10, students have a misrepresented view that all problems in life can be condensed into an equation that students can easily solve. While this teaching approach has significantly reduced the number of failures that occur in the Motion unit for the Grade 10 science course, it is not the correct approach to solving physics problems in the long run. Unfortunately, for students who enrol in Grade 11 physics, such students enroll thinking this is the correct methodological approach to solving physics problems. It is not.

In the Nova Scotian context, students are not required to have a mathematics credit prior to taking Science 10. Students coming from Grade 9 may have failed their Grade 9 mathematics class but have continued into high school. Such students are working at an even greater deficit than those who have marginally or successfully passed their Grade 9 mathematics class. As a result, students who have experienced higher achievement in mathematics have a better chance of success in the Chemistry and Motion units, as such units depend more on mathematics than the Ecology and Weather units. For that reason, teachers in Science 10 tend to avoid complex physics problems to maximize the chance of success for all students at the Grade 10 level, thereby reducing the rates of failure. Teachers also do not go into much depth with the Motion unit and, because of this, some students have a misconception of what physics is all about.

Prelude to the Physics 11 Experience

There are many issues that occur in Science 10's Motion unit. For me, I always tell Science 10 teachers to do the best they can. I encourage my fellow peers to encourage students to see that physics is not just graphs and equations. It is a way of viewing life. If they continue their pathway in learning physics, the Grade 11 physics teachers will enhance and revise students' approaches when solving much more sophisticated problems. Ultimately, there are many opportunities for students to obtain a deeper conceptual understanding of physics.

Upon finishing Science 10, students choose their Grade 11 courses. In my context, students who wish to continue taking physics choose either the International Baccalaureate (IB) program physics or the traditional Public-School Programs (PSP) Physics 11 course. Regardless of the Grade 11 physics course students choose, I treat all of them with three simple assumptions: (1) They have somewhat decent mathematics skills; (2) They have forgotten the Science 10's Motion unit; and (3) They have some idea of what physics will likely entail. It is a problem-solving class that connects our real world to the language of mathematics to which we will apply. Physics is not entirely mathematics problem-solving. It is a way of quantifying and making sense of the world.

With these assumptions in mind, I always tell my new incoming Physics 11 students that they should completely ignore all the assumptions and preconceived ideas of what physics is all about. I want them to abandon any conscious or unconscious bias they may have, related to physics. Everything is open for re-examination. I also tell them that there are many ways to learn physics aside from what they have already learned. The fact that they are sitting in class, prepared to learn physics is a remarkable moment in their lives. The epic experience they are

about to embark on is a beautiful one, filled with many exciting and engaging opportunities for discoveries.

This is important to me because I can start students at the core foundation level of physics, engage students into the active norms that are associated with personal success, and build a sense of awe and wonder, as students continue onto their journey in physics. As such, the active and engaging story of grit and student success in a high school physics classroom begins at the Grade 11 level. So far, up to this point in the chapter, I reflected upon the many positives and negatives that are tied to teaching physics. This includes the pride that I have when I observe my students experience success, but it also means the endless piles of marking, a lack of resources to do countless tasks, and the constant demands and expectations from external stakeholders.

There are many additional factors to consider when examining student success for physics students. This includes the careful planning of the course materials and its approaches, developing assessment materials that are appropriate for student learning, and the mindful consideration related to the social and environmental factors and structures that impact student achievement. Each student in my class brings their own stories of hardships, success, pride and setbacks. As a result, the stories of grit and student success in my physics classroom begin with three main characters: Caleb, Adhira and Violet. All three students began their journey in physics with me.

The Story of Caleb

The Context of Teaching High School Science Courses

When I compare my physics classes to other science classes, such as Oceans 11, it is like night and day. It was taught as a general science credit for individuals who either had no interest

in traditional science courses such as physics, chemistry or biology, or lacked the necessary academic skills and habits that are required for scholarly success. While the Oceans 11 course is considered an academic-level course, the course content is not as difficult or rigorous compared to the traditional physics, chemistry or biology courses. Years ago, I taught a class in Oceans 11. Oceans 11 had very fascinating topics and immediate real-world connections for students. In terms of assessment practices, Oceans 11 often relied on other flexible methods for grading. Instead of utilizing major quizzes, tests and exams like physics, students in Oceans 11 conducted many smaller assignments, hands-on activities and carried out research projects. Whenever a test was required, students had much more flexibility. This included increased time, the use of open-book and open-notes, and tests broken down into several smaller components. In discussing pedagogical approaches with other science teachers, some of these techniques are not often employed in some of the other courses such as chemistry, physics and biology because, for some teachers, they believe it compromises the rigor and high-level expectations that are often imparted in such courses. It is important to note, while I have encountered some teachers who do not ascribe to this belief, some continue to cling to such expectations.

Normally, Oceans 11 has many different attitudes and personalities. Such personalities included students who were genuinely interested in oceanography, to students who needed a science credit to pass high school and, finally, students who had experienced poor academic performance, disrupted learning, and poor attendance and behaviours. In my experience teaching Oceans 11, there was not a day where I did not have some sort of misbehaviour. When I taught the class, I would often have classroom disruptions from students socializing when I was trying to teach, disengagement due to smartphone usage and an occasional object being thrown at another student or me. There would also be major incidences, including non-compliance of

general classroom norms to insubordination resulting in the removal of the student by a higher authority (e.g., vice-principal). I would have to remedy those situations by changing the seating arrangements in my classroom, to talking to the student in the hallway, to calling home to parent(s) or guardian(s) and finally, conferencing with the school administration, student and parent(s) or guardian(s).

To an extent, I do not fully blame the student for such misbehaviours. I do not believe students purposely wish to be disengaged, act out or cause disruptions. However, I believe that all students wish to experience success and, somehow, the circumstance in our schools causes students to disengage and, therefore, such misbehaviours become apparent. The disengaged students enrolled in classes such as Oceans 11 have been unfairly streamed. Instead of addressing the circumstances for the negative actions or addressing the learning needs by providing appropriate social and emotional supports, the impact of streaming has led Oceans 11 to become an unfair destination for students who believe they are not up to par with their higher achieving peers. This disillusioned belief may result in poor morale, negative self-judgments or lead to the circumstances I described in teaching Oceans 11. Therefore, it is important, as teachers, to find ways to prevent this stigma from happening, be it in the Oceans 11 course or in any other course. The messaging of the course is important because it dictates how students see their sense of self worth.

In teaching physics, I would rarely, if ever, get into situations like those in Oceans 11. At the very worst, I would have students being disengaged by socializing or using their smartphones for non-educational related activities. It is important to note that I often emphasize the use of smartphones for educational activities, however, sometimes students take advantage of this opportunity and claim their activities was for scholarly activities. It is rare that would I have

students not in compliance of classroom norms or become insubordinate with me. For the most part, the matter would typically be dealt with inside the classroom, between the student and me. Sometimes, the situations might involve calling the parent(s) or guardian(s) and, eventually, it would sort itself out.

Encountering Caleb

At the beginning of every semester, I start with the same usual routines. I introduce myself and go over the classroom structures, norms and my golden rules. For instance, one of the golden rules is, "Respect goes both ways. I will always show you respect regardless of the situation or circumstance but, I expect that same level of respect, too." The second golden rule is:

> Trust and honesty are the foundation of learning in my classroom. How can you learn and be successful in class if you cannot trust me? But likewise, how can I help you succeed if I cannot trust you or have honesty from you?

A few years ago, I watched a presentation from an inspirational speaker named Simon Sinek. In his presentation, he spoke about the circle of safety. Sinek refers to a story involving individual bulls getting attacked and killed by hunting lions. Eventually, the bulls started to work together in order to prevent the lions from attacking. Regardless of how the lions attacked, the bulls defended each other with their horns and prevented the lions from killing them. I felt this story resonated to me because, in the previous classes I have taught, students who worked as a team and had class cohesion ended up being far more successful than classes that had little to none. Therefore, as part of my opening day routines, I also share the story of bulls and lions with students, hoping to appeal to their sense of teamwork, collaboration and camaraderie. I also

wanted to empower students to develop a sense of community spirit and responsibility for each other.

Getting to Know Caleb

Caleb was not your usual Physics 11 student. But, who is to say what a usual physics student is. For many years, I had a stereotypical view of what a physics student should be. Such students had decent academics, a mostly cooperative attitude, and good respectful behaviour. Caleb was a difficult student from the start. I recall, on the first day of classes, after going through the classroom rules, norms and expectations, Caleb asked to use the washroom. Any student who asks, I always tell them to return within seven minutes. I always emphasize this rule because I want to maximize safety by knowing where students are located at all times. Also, as part of my classroom practice, I never let more than two students out of my classroom at any given time. If more than two students ask, I always tell them to wait until another student returns before going. In this instance, Caleb was out far longer than expected. It bordered on ten minutes. Another student who went after him came back minutes before. Eventually, there would be a bottleneck line-up for the washroom. Therefore, I let a third student out. It was not until fifteen minutes had passed that Caleb came back. At that point, I was very annoyed. If I let the situation slide on the first day, students would know that I did not follow-up on broken rules. But, if I came off too harshly, I may ruin any working relationship I would have with Caleb.

Prior to Caleb sitting back down, I firmly asked him to step out into the hallway so I could have a private conversation. I calmly walked out and addressed Caleb. Seeing how this was the first day of classes, I decided to not show my frustration. Being aware of my body language, tone and demeanour, I spoke in a calm but firm voice. I asked him why he was out for so long. In providing an excuse, Caleb shared that he went to the cafeteria afterwards. Although I

was not happy with his response, I was satisfied that he confessed. I reiterated my classroom expectations and I emphasized the importance of adhering to the classroom rules. It was also important for him to know that trust was very important to me. This was the second golden rule. I said to Caleb that if he had asked me instead of going without permission, I may have allowed him to do so. Regardless, Caleb accepted my explanation and returned to the classroom. As Caleb sat down in his seat, I did not dwell on this incident. I figured it was a simple misunderstanding.

However, as time passed, Caleb would continue to violate the classroom rules and expectations. It was not only one instance of him leaving for the washroom for an extended period of time, it was also social disruptions during classroom instruction. Caleb would try to socialize with students while I was teaching. He would poke or play fight with another student, Phil. Whenever I offered students some class time to do homework and ask for help, Caleb would miraculously escape the classroom without permission. Simply put, Caleb appeared to lack any type of self-regulation or control. His own attitude would be his demise.

Thinking back to all the classroom management strategies I learned while teaching Oceans 11, I changed my seating arrangements so that Caleb would be placed at the front of the classroom. I did this so I could closely monitor him. Additionally, I placed academically inclined students near him, hoping that such social bonds might help him grow as a learner. Any student who had the potential for drawing out Caleb's negative behaviours was moved far away from him. Although it was hard for Caleb to be a social disruption since others around him wanted to be successful, Caleb found other ways to eventually disrupt the learning environment for others.

After several weeks of classes, we had a few open-book homework probes. In terms of my assessment practices, the homework probes were meant to provide me with quick feedback

on my students' ongoing progress. On the first probe, Caleb struggled. On the second probe, Caleb scored more than an 85%. In my class, whenever students earn a score between 70 to a 79%, they earn a small sticker. A student making an 80 to an 84% earns a large sticker. A student who earns a score greater than 85% earns a sticker bomb. Essentially, earning a sticker bomb means that I cover their entire assessment with stickers. In my experience, I found the sticker bomb was one way of motivating and encouraging students to work hard and aim for a higher mark. The sticker bomb is not only a feel-good moment, but it helps students visually see their ongoing success.

Since Caleb earned a sticker bomb, I capitalized on this moment to get Caleb into a better trajectory. I strategized this by first giving the people around him their sticker bombs. That way, I can build excitement around his table. Then, I gave Caleb his homework probe with the sticker bomb. Caleb's reaction was of disbelief and shock. He was ecstatic. As Caleb reacted very positively to his success, he jumped around in excitement. I asked him to go into the hallway. To digress, whenever I have personal conversations with students, I do so in private. In trying to motivate and encourage Caleb to work hard, I congratulated him on his achievement. I also emphasized to Caleb that he had tremendous potential. All he needed to do was to try, put in effort, ask questions and use any opportunity to be successful. At the end of my conversation, I told Caleb that I was very proud of him for scoring a terrific score. As he thanked me, he reassured me that he would continue to try. As Caleb returned to his seat, he was positively beaming. At the time, I reflected on this moment. It appeared that Caleb thrived on genuine praise. Perhaps, in trying to motivate Caleb, I needed to provide some sort of external motivation. Ultimately, throughout the rest of the class, Caleb's attitude changed for the better.

A few days after Caleb earned a sticker bomb, we ran our first physics lab. Usually, I have students pick their own lab groups because, often, students need to do additional work outside of school. In Caleb's situation, Caleb did not know anyone other than Phil. I did not want Caleb to work with Phil because I believed nothing would get done. I was also concerned that, if Caleb and Phil worked with other group members, other students may have to pick up the slack. Therefore, I ended up picking a sociable but friendly group of people that would be appropriate for Caleb.

From observation, it seemed like Caleb blended well with his peers. Days after the lab, Caleb returned to his old ways. He would continue to disrupt the class, disengage using his smartphone and, whenever my back was turned, he would escape the classroom. Around this time, I had received an email from a parent wishing to have a private conversation regarding a bullying incident that occurred in my lab. Any time there is an accusation of bullying, harassment or threats, I deal with the situation swiftly.

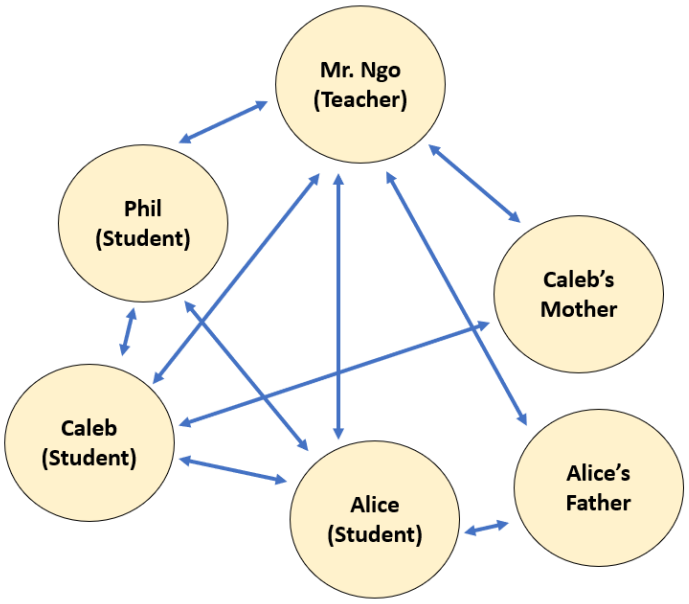

Figure 4. Sociogram of Caleb's relationships in his Physics 11 and 12 classes.

I had a telephone call with the father of the bullied student, Alice. Alice's father claimed that Caleb was picking on his daughter. Although I had been observant of Caleb's behaviour for the past two or so weeks, I did not see anything out of the ordinary within the lab setting. I asked Alice's father to elaborate. Apparently, Caleb had been pressuring Alice to provide the answer to all the lab questions that students would need to do. These questions would later be tested on. Caleb was bullying Alice, trying to ensure his lab mark would be perfect. I was mortified that this happened. I thanked Alice's father and gave him my assurances that I would immediately address this situation with Caleb. I also told him that Caleb and Alice would not be placed in the same group again. At the end of the conversation, Alice's father requested that I not reveal Alice's name when I address Caleb. The concern around revealing Alice's name was to not let the bullying situation get worse. I provided my assurances with Alice's father by honouring his wishes and promised not to reveal Alice's name to Caleb. This incident would be the straw that broke the camel's back. The issue around trust and honesty was one thing, but bullying another student was another issue. I had a mixed bag of emotions when I thought of Caleb. I was frustrated, upset and, at the same time, tired of being stern with him.

On the following day, Caleb arrived in class. I asked Caleb to go into the hallway. As I walked into the hallway, I was still angry and upset. Although I had a night to reflect on the situation, I could not get past what had happened. Everyone in the class was showing measurable growth. Many students' attitudes were improving. Yet, the only person in the class that had negative influences on others was Caleb. In a stern voice I told him that he was not taking any opportunities to be a productive member of the class. Secondly, he constantly squandered any trust I have in him by leaving the classroom without permission. Finally, I told him that other students and their families have been complaining about him. Quite frankly, I revealed to Caleb

that I was tired of him. Caleb did not respond well to what I shared. He kept on demanding that I reveal who accused him of such behaviours. I did not respond. I decided to give him an ultimatum. I told him that under no circumstances is he to leave the classroom. If he does not agree, he is not welcome in the class. I also told him that I would be contacting his family by the end of the day.

In checking PowerSchool, a web-based program that contains students' demographic data and grades, I only saw a contact for Caleb's mother. There was only a cell phone number and an email. I waited until after school, when I was calm and collected, before calling. In calling Caleb's mom, there was no answer. I tried again and all the calls went to voicemail. Knowing that this situation was increasingly becoming worse, I also left an email introducing myself, sharing the positives that I saw in Caleb, but also addressing the increasingly difficult situation. I asked Caleb's mom to reply to me in order for me to set up a suitable time to call back. After waiting a few days, I saw no reply. Caleb's grades were dropping below the passing grade and I wanted to intervene as early as possible so that Caleb would not fail the course. I tried calling again. It went to voicemail. I again emailed his mother, but also shared his failing grades. I also decided to share all my correspondence with Caleb's mother to the vice-principal and the department head of sciences. That way, I could start laying the foundations for other possible interventions. After several days of waiting, I did not receive any contact from Caleb's mom. It appeared that Caleb's mother could not provide help at this time. Therefore, this approach of contacting home was not fruitful in minimizing Caleb's behaviour while trying to put structures in place to allow Caleb to succeed.

One day, I did not see Caleb appear in class. Although Caleb was a disruption, there was one plus about him in that he rarely ever missed class. I did not think anything of it. Deep down,

it was a sigh of relief. The class went beautifully. Students were engaged and the mood within the class was upbeat, happy and less tense. For the most part, not having Caleb that day was probably the best thing that happened all semester. I know that sounds awful to an outsider, but one student can really change the dynamics of the classroom.

The following day, Caleb again did not come to class. I thought it was odd and so I decided to investigate. I investigated his PowerSchool records to see if he was attending other classes, but only skipping mine. Apparently, he was also missing his other classes. With Caleb not being in class, it gave me an opportunity to determine whether his attitudes were also present in other classes. I reached out to his other teachers and found out that Caleb's attitudes, behaviours and grades in other classes were like mine. He was non-compliant regarding classroom rules, often taking extended breaks in the washroom and often making poor decisions in class. Through this investigation, I learned that Caleb was missing class because he broke his hand in an altercation while wandering in the hallways.

Upon Caleb's return from his suspension, his hand and arm were still in a cast. He could not write. Anytime there was a written assessment, someone needed to scribe for him. Luckily, my department head was able to scribe for Caleb. It is also noteworthy that my department head is also the lead physics teacher at the school. While scribing for Caleb, he noted that Caleb did not appear to have a clue with what was going on. In truth, I admittedly gave up on Caleb. I reflected on the amount of time I spent focusing on Caleb. I was not spending enough energy, attention and focus on other students.

I decided to have a longer and in-depth conversation with my school administration. Although the vice-principal was helpful in providing information about Caleb's background and behaviours, this avenue was not helpful. As the weeks went on, Caleb's grades fluctuated

between a passing and a failing grade. Whenever Caleb was successful, I encouraged and motivated him by buying him a pack of gum or giving him some treats. Whenever he acted poorly, he was dealt with appropriately. I know some teachers opted for booting him out of the class. But, for me, Caleb could still pass. Asking him to leave the classroom would be counterproductive and could cause even more long-term issues.

Parent-teacher meetings would arrive and I did not expect to see Caleb's mother. Surprisingly, Caleb's mother was waiting outside my classroom to meet with me for parent-teacher. I greeted her, welcomed her to my classroom, and offered her a seat at the table I had set up. She gave me a nod, but provided no verbal response. As we sat down, my heart raced. I felt like I needed to be on guard because Caleb's mother was not very happy to see me. Her arms were crossed. She did not smile. She looked like she wanted to vent her anger at me. Still, I maintained my composure and continued to be very friendly and welcoming to help diffuse any potential negative situation that may occur.

In starting the conversation, I shared some good news. I often found that sharing positive news often leads to a less confrontational situation with parent(s) and guardian(s). As I spoke about Caleb's recent sticker bombs and some modest growth in basic concepts, Caleb's mother continued to nod. She did not have any words. Her arms were still crossed, and her demeanour did not change. I finally gave her the bad news. I said that Caleb was close to failing. His grades were in the low 50% range. Immediately, Caleb's mother pounced on me. She accused me of not helping Caleb and suggested that he was doing poorly because of my actions. By the tone of her voice and the finger pointing, it was clear that she was upset. To me, it felt like I was a child being scolded by my parents.

As much as I wanted to vigorously defend myself and vent my own frustrations, I did not want to add fuel to the fire. I also had parents and guardians in the hallway who were waiting for me and, seeing how this would be my first in-person interaction with parent(s) and guardian(s), I did not want to make a bad first impression. I calmly replied to Caleb's mother by sharing all the interventions I have provided. As I finished my sentence, she scoffed at me. It was apparent to me that she did not want to hear what I had to say. I interpreted this as being my fault and she wanted to blame everything on me.

Instead of taking full ownership of Caleb's situation, I decided to tell her that I made several attempts on several occasions to communicate with her. Yet, she never contacted back. I reiterated the fact that I wanted Caleb to be successful in physics and that I was on her side. As the conversation passed seven minutes, parents started to knock on the door. I said to Caleb's mother that I had to wrap things up because these sessions are supposed to be brief. In my closing statements I said that I would love to have a lengthier conversation with her and hopefully we could work together in developing Caleb's success. Unfortunately, without saying a word, Caleb's mother got up and left. In trying to follow-up with Caleb's mother, I again received no response.

As the semester drew to a close, Caleb was at the cusp of failing. Caleb did not qualify for an exam exemption due to the significant amount of missed class time. Because Caleb needed at least a 20% on his exam in order to pass the course, my intention was to try to get Caleb as high a semester grade as possible so we could lessen the reliance on the exam grade. Two weeks before the exam, I was informed by the vice-principal that Caleb fell down the stairs and had concussion symptoms. Caleb had a doctor's note and would not be writing the exam. Therefore, the grades needed to be adjusted so that his semester grade was the only component for his final

grade. I re-calculated his grade, making his major assessments worth more, and it was still a failing grade. As I recall, it was a 46%. I had met with my department head and my vice-principal. I said to the both of them, that if Caleb had written the exam, it would be more than likely that he would have gotten the necessary grades to pass. I asked if it was possible for Caleb to be bumped up to a pass, under the condition that he does not take physics in Grade 12. While my department head and vice-principal approved of the pass, they did inform me that there was no way of enforcing that condition.

On the very final days of school, Caleb came back to class. As he entered the room and sat down, he wore sunglasses and was much quieter than usual. I asked him if he was okay. Caleb told me that he was still having major headaches and light sensitivity issues. It was clear that his attitude, body language and demeanour were different. As we talked, I asked him if I could have a private conversation in the hallway. In talking to Caleb, I told him about the circumstances around his grades. Even with grade adjustments, he would still fail Physics 11. Caleb was visibly upset. He did not raise his voice, but he was frustrated that he was unable to do the exam because of his concussion symptoms. He expressed that he could not study or focus for lengthy periods of time. He said he could try, but it is very difficult to do so. I told him that I was sympathetic and that I was willing to provide him with a conditional pass. A conditional pass would mean that he would not take Grade 12 physics. Caleb agreed to the offer and thanked me. Before leaving, Caleb inquired as to why he would not be able to take physics. I explained to him that he had tremendous gaps in the concepts in Physics 11. Much of the curriculum taught in Physics 12 is an extension of Physics 11 and, with the numerous gaps and low performing scores, he would more than likely fail Physics 12 as a result. Caleb gave me a nod and said that

he would not continue into Grade 12 physics. The semester ended and I had a sigh of relief that I would not be teaching Caleb next year.

In the following year, on the second semester, I saw Caleb walking through the door. He came in, greeted me, and sat down. He then revealed that he was enrolled in Physics 12. Immediately after he said that I sort of laughed to myself. In my head I wondered if he was pulling my leg and joking with me. While such thoughts floated in my mind, I also remembered about the conditional pass in Grade 11. In those split seconds, I wondered why he reneged on our deal. I also wondered why he did not consider the numerous gaps he had in Physics 11. Instead of reacting, I decided to smile, nod and slowly walked to the front of the room. As new and former students were arriving, I did not want to create a negative first impression for the beginning of the year.

Class introductions went as well as expected and there were no problems. Although Caleb was being his usual self, he did not behave nearly as badly as he did last year. At the end of the class, I asked Caleb to stay behind so I could speak to him. I reminded him about his grades and achievement levels from last year. I also reminded him about the conditional pass he agreed to and how the deal was contingent on him not continuing into Physics 12.

While Caleb accepted my response, he provided an explanation to why he did so poorly. Caleb acknowledged that he goofed around way too much, and he did not take anything seriously. He wanted an opportunity to prove himself, be able to try again and do better in all his classes. As he shared his commitment to be successful, I was reluctant about his pledge. Still, it was nearly a year since I last saw him and he could have changed for the better. At the same time, I could not renege on the deal because my vice-principal and department head had already warned me about their inability to enforce the deal if he decided to continue into physics.

I told Caleb that I was not willing to renege on the deal but informed him that Physics 12 will be a major hill to climb. I told him that his previous behaviours would not be tolerated and that I expect nothing but the best from him. As I put my hand out, I asked him to commit to a better semester with me. As we shook hands, smiled and nodded, I also said to him that, if he needed help or was not sure of something, he needs to let me know right away. He agreed, thanked me and left.

After Caleb left, I did not feel very optimistic about Caleb's chances of success. I felt ashamed that I felt this way; however, I was pragmatic based on the behaviours I saw from Caleb. I was bothered by the numerous incidents involving him and was also annoyed that he reneged on our deal. As I recall, I went and spoke to the department head and the vice-principal about Caleb taking Physics 12. Both gave me a long sigh. Again, they both reminded me that there was no way to enforce the condition as previously discussed.

A New Year to Grow

The first few weeks of classes were more of an academic challenge than a behavioural challenge. Caleb no longer escaped and left the room. Whenever he asked to use the washroom, he always returned at the appropriate time. Although I also had Phil in the same Physics 12 class as Caleb, I continued to enforce the rules around them sitting with each other. I wanted to ensure that both students were successful and the attitudes that occurred last year between them would be avoided.

We started the first two weeks with reviewing previous Physics 11 concepts. Caleb asked appropriate questions related to the review. Whenever there was an opportunity to have an open discussion about a particular topic, Caleb gave his point-of-view. Although most of his responses were considered from left field, I appreciated his insights and did not discourage him from

trying. In my attempt to help develop a sense of self-confidence in Caleb, I provided him with positive feedback, telling him that I was amazed about his drastic turn around. I gave him many examples of such positive efforts. Such examples included joining the classroom conversations, making attempts and being a very productive member of the class. I told him that, if he continued to try, I believe he would see further grade improvements. Caleb was very pleased and reaffirmed his commitment to work hard and try. For the first time, I felt a sense of maturity in him. He did not jump around like a kid when he received praise. He accepted it, smiled, thanked me and continued.

Following my conversations with Caleb, it was evident that Caleb struggled on his assessments. His first few homework probes were borderline passes. However, I did notice Caleb trying and was not blaming his poor grades on last year's attitudes. I decided to have another follow-up conversation with Caleb. In acknowledging his poor grades, I also emphasized the significant growth I had seen in him. I told him that I know he has been trying and taking more responsibility by utilizing the available online resources to do better. Despite all his efforts, he asked why he was performing poorly. I told him that it was because of his gaps from last year. However, I encouraged him to continue doing what he has been doing. I also encouraged him to ask for help whenever he needed it. By doing so, he will see increased success.

As the conversation continued, Caleb provided me with some examples of his efforts. He said he often reviewed practice problems at home, reviewed all his notes and used my online resources. I felt my heart break. Presented in front of me was a student who was clearly trying. In his vain attempt to put in an effort, he was stumbling. I could hear the frustration in his voice and, although he told me he felt like giving up, he conveyed that he was not willing to do so. In providing an olive branch to Caleb, I asked Caleb to attend one-on-one extra help. I said that, if

he did that, it would give me an opportunity to provide him with further feedback. I also offered him an opportunity to re-do all his poor homework probes if he attended extra help. I told him that this re-do is not standard practice for the class, but it would help him rebound his grades. In the end, Caleb did not attend the extra help session. Caleb ultimately preferred to do independent study. As a result, I allowed him to re-do all his poor homework probes with different questions. Through this opportunity, some of his grades improved slightly.

After several weeks, Caleb showed some progress but also showed early indications of poor behaviours. I eventually gave up on having a seating plan. For the most part, all students were very determined, serious and committed to doing well. Scholarships, placement at different colleges and universities, and teacher references depended on stellar academic and behavioural performances. I was still adamant that Phil and Caleb must not sit together because, when they were separated, their grades improved. Whenever they worked together, they would socialize, be off-task and, as a result, their grades suffered.

Caleb would give me some pushback. He was upset and angry. He accused me of playing favourites because I would allow others to sit wherever they wanted but not allow him to sit with Phil. I asked him to go into the hallway. As he calmed down, I told acknowledged his phenomenal efforts and improvement since last year. I told him that his grades, behaviours, and effort were significantly different and that he was heading into the correct trajectory. I admitted to him that the reason why I did not want him to sit with Phil was because he often lacked the ability to regulate his social behaviour.

Although Caleb started to calm down, he still did not accept my position. He did not nod. He kept his arms crossed. And whenever I made any points, he rolled his eyes and was visibly annoyed. I decided to give him a more recent example. I told him about the last lab he worked on

with Phil. In that instance, everyone in the class made at least an 80%, yet he and Phil were the only failing grades. Caleb pushed back. He finally spoke. He told me that it was not fair. As he acknowledged his ownership for his failure, I decided to concede.

In Caleb's perspective, he did make a point. It was difficult to let everyone sit wherever they wanted, but not let Phil and Caleb sit together. Although Phil and Caleb were not play fighting or messing around as badly as they did originally in Grade 11, I decided to give it a try and allowed Caleb to sit with Phil. However, I told him that, if the situation does not work out, I would renege on this deal.

By the end of the unit, Caleb earned a low 50%. The grade was not as high as I would have liked. Still, it was near March Break and I gave Caleb some hope. I told him that the unit he just completed was heavily connected to the materials he had major gaps in. However, the materials in the upcoming unit will be new and have very little connections to Grade 11. I asked him to continue to try, put in effort and focus on improving. Caleb was pleased with the opportunity to do better and boost his grades.

When There is Adversity, There is Opportunity

Prior to March Break, the Coronavirus (aka COVID-19) started to take hold in Canada. Cases were in the hundreds across Canada and, in Nova Scotia, the province started having single digit cases. By the end of March Break, cases started to climb into the double digits and all schools in the province eventually closed for the rest of the month to prevent the spread of COVID-19. Eventually, students, teachers, and parents and guardians were told that the physical schools would be shut down indefinitely, and the school would be coordinating on a plan to provide online learning by early April.

Once a plan was formulated, I started to set up an online-based environment for students to learn physics. I did several things: (1) I created asynchronous lessons for my students; (2) I recorded video podcasts of each lesson; (3) I placed worksheets with solution keys online; (4) I appeared on Zoom, an online teleconferencing program, daily for several hours to provide visual extra help; and (5) I generated weekly assignments that fulfilled the materials taught in unit 2. During this time of crisis, other than a few students who did not have access to the Internet, I maintained full student participation. This included Caleb.

Daily, I would see Caleb appear online and try to participate to the best of his abilities. He did not have a functional camera and, whenever he participated, I would only hear his voice. I had found out later that Caleb did not have a usable computer. He used his damaged smartphone to stay in contact with class via Zoom. Whenever Caleb participated, he did all the assignments and, although he did not have the resources to print off his assignments, he did find someone to take a picture of his assignments and upload them to me. All of Caleb's work was better than expected. Much of his work would score between an 80 to a 90%. Sometimes, his score was a 100%.

It was nice to see Caleb continue his efforts in class. However, at the time, I admit, I suspected plagiarism. His work was almost too perfect considering his poor efforts in the previous year. I also considered Alice's bullying incident as another reason why his grades might be overly inflated. I did not have proof and I did not have any complaints from other students, parents or guardians regarding Caleb. Therefore, I left it as is. I did not want to accuse Caleb of something unless I had some definitive proof.

My Epiphanies Related to Caleb

By mid-April, the Department of Education and Early Childhood Development, the governing body that regulates education in my province, announced that students' grades would not drop below their pre-March Break levels. Any student who wished to do work via the online environment would have an opportunity to boost their grades. However, any student who did not do the online materials would not have their grades dropped. The day following that announcement, I lost over two-thirds of the students who either actively attended online extra help or submitted any work. In trying to appeal to my students' sense of responsibility for future achievement, I only retained less than a third who continued. I thought Caleb would not continue but he did and I was shocked. Is this the same student that I taught in Physics 11?

Week after week, Caleb continued doing well. I was honestly humbled to see Caleb take full responsibility and excel so much in a short period of time. I had an epiphany. How did Caleb drastically turn around so much and so fast? I did not do anything other than develop an appropriate setup for all students to continue their education, albeit online. Am I wrong about Caleb?

The school eventually provided students with loaned computers for online learning. Caleb retrieved a computer and continued doing his work. We also did computer-simulated labs. Every assignment a student did, I left feedback and encouraging notes. One of the units in Physics 12 was the electricity and magnetism section. It was one of the harder units of Physics 12 and Caleb continued to excel in it. I made a note to Caleb. I told him that, I was very impressed with his hard work and that I was proud of him. I reiterated the difficulty of this assignment, yet he did it very well. I told him that, based on other people's submissions, other people had significant challenges. Yet, he did the assignment flawlessly. In an effort to bolster

his confidence, I suggested that he may want to investigate a career in electricity. That he surely has a knack for it.

I did not receive any feedback from Caleb. However, in late May, I received an email from Caleb's grandmother. She introduced herself to me and shared her utmost thanks and appreciation for the time and commitment I had put into Caleb's work. She acknowledged that Caleb was making bad choices and had other family members working with him throughout the year. She pointed out that my comments about Caleb being an electrician was insightful because Caleb's grandfather and father are electricians. In trying to motivate Caleb, she offered Caleb twenty dollars every time he received positive comments. She also gave him five dollars every time he submitted his work on time. She jokingly said that Caleb continued to max out her account. In her closing statements, she thanked me for all the time I spent with Caleb.

A colleague at work, who knew Caleb outside of school, bumped into Caleb on the street. My colleague told me about his conversation with Caleb. Caleb confessed to him that he had significant difficulties with physics but, now, he is really enjoying it. At the end of the year, Caleb earned a grade of 65%. Although his grade did not include major summative assessments, he did do all the work provided. I also mailed Caleb a handwritten card thanking him for his efforts, acknowledged his hard work and dedication throughout this entire ordeal and congratulated him on his graduation.

Learning from Caleb

While Caleb initially started off with a low-degree of grit in his Grade 11 year, he slowly developed grittier traits and ultimately became successful in Grade 12. Through my reflection of Caleb, I learned that there are many contributory factors that impact grit. For example, I believe one of the reasons why Caleb had a low-degree of grit was because he was not used to sustaining

effort in challenging courses like physics. When encountering difficulties, instead of asking for help or making an attempt at problems, he would often act up. He would either cause some sort of disruption or escape the classroom. Through his lack of self-control, his academics suffered and, therefore, this impacted his self-confidence and his grit.

Throughout the time I taught Caleb, Caleb also maintained the reputation of acting tough and often showed little vulnerability. He appeared to hang out with a social group that significantly differed from those who took physics. While Duckworth et al. (2007) and Duckworth and Quinn (2009) discusses grit through domain-specific factors such as perseverance of effort and consistency of interest, I learned through Caleb's experience that social factors also played a significant role. Such social factors are not part of the underlying grit test from Duckworth et al. or Duckworth and Quinn. When I look back and reflect on one instance where Caleb radically changed his gritty behaviours, I must think about his online learning experience during COVID-19. Perhaps when schooling separated Caleb from social situations, it gave Caleb an opportunity to learn and grow without the stigma of scholarly achievement within his social group. Ultimately, there are many other factors that contributed to Caleb's grit and success in physics. However, it is important to note that, although my journey with Caleb was a difficult one, his story taught me so much about grit.

The Story of Adhira

Encountering Adhira

I first met Adhira a year prior to her being enrolled in my Physics 11. Like many teachers in my school, I had additional administrative responsibilities aside from teaching. These responsibilities included supporting other students in other classes, doing hallway patrol or co-teaching with another teacher. The first time I met Adhira, I was walking and doing patrol. The

goal of hallway patrol was to maintain a teacher presence while removing loitering students in the hallways. If students were loitering, they were asked to either go into the library, cafeteria or leave the school entirely. I remember Adhira sitting on the floor, studying in the hallway with all her notebooks, laptop and textbooks splayed over the floor. I greeted her and asked her if she would be more comfortable in the library. She hesitated, informing me that the library could be noisy at times and she found the hallway to be much quieter. In that moment, I looked at Adhira. I did not see any harm having a student in the hallway who was clearly studying and being non-disruptive. After acknowledging Adhira's need for quiet, I smiled and continued walking.

Weekly, I would see Adhira firmly placed at her usual spot. It became a weekly encounter where it would be a race to see who said "hello" first. One time, I recall Adhira asking me what courses I taught. As we got to know each other, I found out that she was a Grade 11 student enrolled in the International Baccalaureate (IB) program. Part of the requirement for the IB program was students could not take more than two science courses. In Adhira's case, she took chemistry and biology. At that moment, I chose not to invest my time in trying to recruit Adhira into physics because she was already enrolled in Grade 11 IB classes. In her case, it would be near impossible for her to switch to a completely different science course in Grade 12. The only way she would be able to switch classes is if she dropped out of the IB program. At least, this was the traditional norm at my school.

The following school year, Adhira was in her Grade 12 year. On the first day of classes, surprisingly, I saw Adhira walk into my Physics 11 classroom and sat at the front of the room. I asked Adhira why she was in my room and not in another actual class. She casually responded by telling me that she dropped out of IB and wanted to take physics, instead. I promptly welcomed her to my class and began the introductions to all students.

Getting to Know Adhira

Looking back to Adhira's Grade 11 physics class, Adhira would be one of the hardest working and most determined students in my class. In every class Adhira attended, she was very eager, enthusiastic and seemed to joyfully learn the materials. Adhira never seemed prone to stress. Whenever she committed herself to challenges, she always found ways to overcome obstacles that held her back. She always took every opportunity to learn and improve herself. For me, it was incredibly refreshing because, much of the time, I am always focused on supporting and nurturing other students' abilities. Yet, she was self-motivated and self-directed and, therefore, she was literally the ideal student that other students should model themselves after. As a result of Adhira's strong skills, my focus was to develop Adhira's need to pursue higher-level problems.

As I got to know certain students more, I would have strong and impactful relationships with many of them. I would describe many of my relationships to be mentor-pupil relationships. It felt humbling to be able to have a student trust me in guiding them on their journey. As a result of my experiences, I would describe my relationship with Adhira to be just that, a mentor-pupil relationship. I was lucky because I was able to get to know Adhira for several months prior to her taking Physics 11. Because of that context, I was able to speak to her more freely.

One day, during lunch time, Adhira came and asked for additional extra help. I remember Adhira struggling with a problem that I gave in class. After several minutes of diagnosing her struggles, I gave her some suggestions and strategies to overcome the obstacle. As I worked with Adhira, I had a lingering question to ask her. For weeks, I was curious as to what ethnicity Adhira was. As a second-generation Vietnamese-Canadian, whenever people ask me what my ethnicity is, I would reveal my Vietnamese identity. After which, most follow-through questions

would be, “When did you come to Canada?” This question would be a sensitive one for me because, whenever people ask me that question, I always feel like I do not belong. I would feel like I am an outsider. Therefore, in being mindful of other ethnic individuals, I often avoid asking such questions until I have a long and established relationship with the other person.

Because of my established relationship with Adhira, I asked her what her ethnicity was. Before she could respond, I also told her that I did not want to sound insensitive because whenever someone asked me that question, I sometimes feel like an outsider. Adhira replied and told me that she is Indian. She also reassured me and said that she did not feel it was an insensitive question to ask. Adhira had asked me why I asked and I mentioned to her about the slight accent in her voice. I said that in Vietnamese language, I must change accents when I spoke and so, while I do not have Vietnamese accents in my English, I noticed slight accents in hers. She revealed to me that she spoke Telugu and Hindi, and that English was her third language.

On average, my classroom would be diverse. I would have students from all walks of life. In addition, my students would mostly be native-born Canadians with a few immigrant students, and a few international students. Adhira identified herself to me as being a first-generation Indian-Canadian. As time went on, Adhira often shared pictures of her culture (e.g., traditional clothing, pictures of food and videos of her ethnic dance performances). This experience gave me great insights into her culture and her customs.

A week before Diwali, an Indian holiday celebrated by Hindus and non-Hindus, Adhira asked me if I knew what Diwali was. I quickly replied and said, “The Festival of Lights.” I immediately saw her react. Adhira was stunned. She got excited and asked me how I knew that. I went on to explain that I had a few Indian friends back in university who celebrated Diwali. As

we both chuckled, I asked her if she wanted me to modify any of her upcoming due dates so that she could celebrate with her family. I reassured her by saying that such accommodations are often made for other students who celebrate other cultural holidays too.

I remember Adhira immediately giving a long sigh. She went from chuckling to some disappointment. She told me that she will not be requiring any accommodations because she will be keeping a regular school schedule. I quickly chimed in. I reinforced the importance of celebrating major cultural holidays. I also told Adhira that my Indian friends once told me that Diwali was one of the biggest holidays of the year. It was almost paramount to Christmas. I shared with her my own experience with Lunar New Year. During Lunar New Year celebrations, I would spend considerable amounts of time celebrating with my immediate and extended family. Asking my bosses for extensions and accommodations has helped me take part in such celebrations.

In the end, Adhira thanked me for encouraging her to celebrate her cultural holidays. She also thanked me for my flexibility and willingness to allow her to celebrate Diwali. Sadly, Adhira's response was spot on. She informed me that other teachers are not as flexible or do not understand the importance of Diwali. She told me that if she was to let loose and have too much fun, she will end up paying for it because she will have to spend a lot of time catching up and, as such, it may cause her to stress.

Physics 11 classes would not always be the same boring routine. In some of my classes, students are often working in groups. These group activities would include solving major problems, collaborating on group projects or working on a physics experiment. One of Adhira's best qualities was her ability to work with many different students of different diverse backgrounds. Regardless of the activity, I often observed her working well with others, was very

friendly, respectful and caring of others, and I never once had a complaint or negative remark about her from other students.

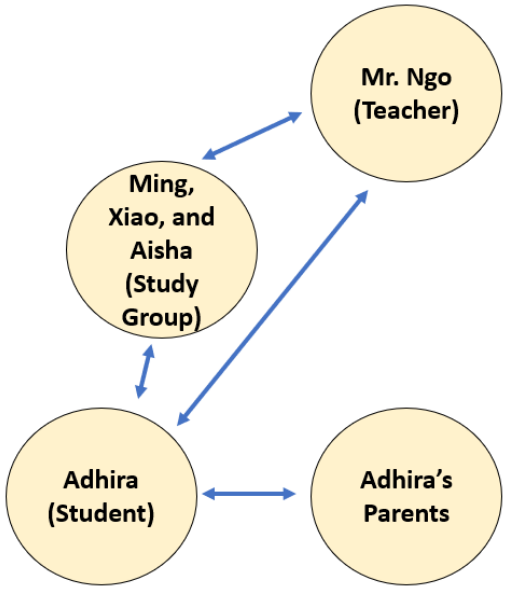

Figure 5. Sociogram of Adhira's relationships in her Physics 11 and 12 classes.

Adhira always worked well with everyone. By the middle of the semester, Adhira drastically shifted to a different cohort of students. In her case, she started working more closely with ethnic, immigrant and international students. In my class, Ming, Xiao and Aisha were newcomers to the Canadian education system. While Ming and Xiao were new immigrants to Canada, Aisha was an international student. Throughout the semester, Ming, Xiao and Aisha were very reserved. They hardly spoke up, laughed or showed any expressions. Often, Ming, Xiao and Aisha would keep to themselves. Because of their social isolation and language barriers, they had poor academic performances. However, when Adhira joined with Ming, Xiao and Aisha, all three students improved academically and became more sociable. In a short period of time, Adhira brought other native-born students to their peer group and, as a result, everyone thrived.

Through such experience, I wanted to recognize Adhira for her selfless efforts. I told Adhira that I was very appreciative of her willingness to work with them and helping them feel included in the class. Adhira was very humble with her response. She smiled and said that she was happy to do so. I was curious to why she independently chose to help Ming, Xiao and Aisha, and, so, I asked her. Adhira said that she liked to mingle with many other Canadian students but felt very connected to other people of color or people from other places because she felt like she could help them.

As the conversation continued, I was further intrigued. I got curious and inquired about what she meant by "helping them." Adhira told me about her experiences when she first came to Canada. She felt very much like Ming, Xiao and Aisha. She barely spoke English and had no idea on how to navigate Canadian schools. She said that she cried on the very first day of classes. However, she said she was lucky. She had friends and teachers who helped her through that process. She said that she did not want others like her to feel the same way.

Towards the end of the first semester, Adhira would finish the course with a mid-80%. Although she was bummed that she had a lower than expected mark, I always emphasized to her that her grade was not reflective of her intelligence but rather a reflection of her ability to solve all levels problems of varying difficulties. This included easy knowledge recall problems to application of multiple theories and concepts and, finally, solving for high-level critical analysis problems. Such problems are very different than what we would have learned. Therefore, a student who earns a 100% should be one that can solve the hardest Physics 11 problem with little to no issues.

A New Semester with Continued Growth

The second semester would begin and Adhira continued her Physics 12 journey with me. I felt excited and happy that I would have the opportunity to work with her some more. Although Adhira was slightly unhappy with her lower than expected Physics 11 grade, she accepted my rationale and mentorship, and vowed to do better this semester. Adhira was very excited for a new start. She asked me what we were going to learn and what direction this course was going to take. As I shared with her broad topics like mechanical engineering, architecture, astronomy and electrical engineering, her eyes lit up and she told me that she was happy to learn new things.

I was happy being able to hype-up and bring excitement to Physics 12. I did not just hype it to Adhira but towards any Physics 11 student entering Physics 12. I managed to get some feedback from some of my higher performing Physics 11 students. To them, Physics 11 was rather boring in topics but easy enough to comprehend. Some students admitted that they were happy to apply what they learned into something that is done in the real world.

During the first few weeks of Physics 12, Adhira would continue excelling in the materials. I admit that the mechanics materials in the first unit of Physics 12 would be some of the most difficult materials in physics. In my perspective, if students did not have a firm grasp of the materials in Physics 11, they would be disadvantaged in Physics 12. Such students would have a steeper hill to climb to earn higher grades. In some cases, students work extra hard and consult with me on an ongoing basis, and eventually end up being just as successful.

Adhira continued with all her former strategies for growth. She always asked questions, always sought out extra help and clarification, used all resources available to maintain success and, noteworthy for this year, she formed a study group with Ming and Xiao. Both Ming and Xiao continued into Physics 12. Adhira also made new connections with students in my Physics

12 class. Her ability to teamwork and form this small study group not only helped her increase her chances for success, but it also enabled others within the group to overcome difficulties through collaboration. In the previous year, I was doing hallway patrol as part of my administrative duties. However, this year, I spent my time providing mathematics extra help in the library. While I did my duties there, it always felt humbling and rewarding to observe Adhira and her study group working in the library. It was clear from the student's recent grades that all students within Adhira's study group continued to improve and excel.

In my class, whenever any student shows significant improvements, I always praise their efforts and their hard work. I again spoke to Adhira and reinforced my utmost appreciation for her leadership, dedication and efforts. It was through her direct involvement with the study group that allowed others within her group to be successful. I told her that she is the epitome of what success truly means. It was her own individual action, choices and dedication that led her to this high degree of scholarly achievement. For me, I was always a guide along for the ride.

As always, Adhira was positively beaming. She thanked me for my compliments and continued support. I followed up. I inquired with her if her parents spoke English. I told her that I would love to call home and tell her parents how tremendous her work was. Adhira admitted that her parents could not speak English and calling home would not be possible. I asked her if she would settle for a letter. That way, it could be official and she could translate the letter to her parents. Adhira smiled and said that her parents were aware of her schoolwork and that I did not need to write a letter. Adhira appreciated the thought and, therefore, I left it at that.

A Storm on the Horizon

By midterm, Adhira would continue earning a mid- to high 80%. Adhira would be one of my strongest achieving students in my class. But, by late April, things started to change. I began

to notice a decline in her grades in the new unit on Electromagnetism. Although the materials in the Electromagnetism unit would be harder than the previous units, we just started the materials and it was typical to see some grade variation among students. Adhira's grade variation was not too concerning to me because Adhira was always a student who would find ways to cope and overcome challenges. Therefore, I did not feel like I needed to intervene and discuss with Adhira about her sudden change in performance.

As time went on, Adhira's grades continued to decline and I started noticing her miss class. Although Adhira infrequently missed class in Physics 11, she always found opportunities to make up the missing work. However, this time around, whenever she missed class she never checked in or sought out missing materials. I decided to have a casual conversation with Adhira in order to inquire about her declining grades. As we chatted, I informed her that I was still around to help her whenever she needed. Adhira mentioned about the difficulty in some of the materials but also revealed that she had been slacking. In trying to reassure me, she said that she would continue to review the online resources and work with her friends to improve.

A week after this conversation with Adhira, Adhira continued to miss more classes. There were days that she attended class on time. There were other days where she would either come to class late or not at all. Missing significant amounts of class time would be very out of character for her. I admit I was becoming increasingly frustrated and annoyed with Adhira. Whenever I intervened by talking to her about her missing classes, she would often promise me that she would fix her mistakes or that she was sorry. Still, she continued to repeat the same mistakes repeatedly. Nothing I said was getting through to her and I was annoyed that my star student suddenly became one of my poorer performing students.

A big part of my frustration was not being firmer in my initial intervention with her. I have always abided by the quote, “Once the rot sets in, things start to fall apart.” The rot in this case was her sudden grade variation in late April. I should have intervened there. Perhaps if I had, she would not be in this mess. I felt incredibly guilty and responsible for her situation. I often made rationalizations in that Grade 12 students are almost adults. I cannot be responsible for their decisions and actions. Yet, as the mentor to my pupils, I still had a responsibility. Regardless, how I internally reflected on this matter, I always concluded that it was totally on me for not being firm when I should have.

Up until this point, my relationship with Adhira would mostly be positive. We would continue to have friendly conversations about school, her Indian culture and her plans for university. There was never any mention about negative things going on in her life. But, as grades declined, she became more reserved. She stopped working with other peers in the class, infrequently worked with her study group and essentially stopped most of her proactive measures for success. By mid-May, the situation got to the point where it was either make or break. I felt that, if she did not change her trajectory, she might likely receive grades that fell below the minimum requirement for admissions to university.

One day, we were doing a tricky question in class. I told my students that they needed to pay close attention to the problem we were doing because the exact problem would appear on their upcoming test. While everyone was focused on my explanation, I observed Adhira with her smartphone in her hands, completely disengaged and texting someone. I got visibly upset and furious. This was the final straw for me. I stopped the lesson and, in a very stern voice, I told Adhira to go into the hallway. I told my class to take a short break while I dealt with this matter and I walked into the hallway to confront Adhira.

When I confronted Adhira, I was visibly angry and frustrated. I believe she knew I was upset because I never acted in this manner towards her. In a very stern voice, I told her that I have done so much and provided so many opportunities for her to be successful but she never followed through. Adhira's head and eyes were down. She did not respond. I could tell that she was starting to get upset. But I was not done. I continued to rant. I told her that she was my strongest performing student. Yet, how did she suddenly turn into one of my poorer performing students? I also told her that I was upset that she was not paying attention to a very difficult concept we were doing and that the same concept was going to appear on the test. I told her that she clearly prioritized using her smartphone rather than doing well. I finally revealed to her that I was tired of this situation and that, if she wanted to do badly and not get into university, then her consequences will fall entirely on her.

Negative emotions are never part of my teaching style. To me, being furious and upset with Adhira would be out of character for me. In my past experiences, yelling at a student or being upset rarely worked. Yet, I was so incredibly frustrated in that moment that I projected my anger and frustration onto Adhira. At the time, I honestly felt let down. I felt incredibly responsible, as well, and nothing I did worked. As the rant ended, Adhira's eyes started to well up with tears. She started to cry and tears streamed down her face. She asked to go to the washroom. I let her go. I went back to the classroom and taught as normal. I was still visibly upset. I was not angry anymore but I was heartbroken for causing Adhira to cry and possibly ruining a mentor-pupil relationship. Adhira would not return to class until the last five minutes before the class ended.

My Epiphanies Related to Adhira

As class ended, Adhira packed up all her stuff and started to walk out. I calmly asked Adhira to stay behind for a moment. Once all the students vacated the classroom, I spoke to Adhira. I apologized to her and told her that I dealt with the situation incorrectly. I should not have let my emotions get a hold of me when I spoke to her. I told her that I really cared about her and all the students in the class. I reinforced her amazing abilities by telling her that, throughout this journey, she always performed at her best. I admitted to her that I felt very frustrated and responsible for not being firmer when her grades slipped.

Adhira sniffled and then her eyes started to well up again. As she cried and tried to talk, she told me that she did not want to fail. She revealed to me about her family's situation. She said that her parents have been sick for several months. Her mother and father would go in and out of the hospital. They would go to the doctors and, because they could not communicate in English, she would have to translate for them. She continued crying and I grabbed some tissues and tried to console her. Through her crying, she continued telling me her situation. She shared that, every time she was late or she missed class, it was because she had to book the appointments for her parents or act as a translator between her parents and the doctors.

Adhira continued to cry. As she started to crouch down and sit on the floor with her arms crossed and head between her arms, I also sat down next to her. I wanted to side-hug her but I was not sure if that would be proper professional conduct. Therefore, I tried to console her by apologizing to her. As she continued to cry, she said she wished she was like other teenagers. In retrospect, I believe she was venting her own personal frustrations. She wanted to very much be like other teenagers but her responsibilities to her parents and her parents' lack of English

communication skills prevented her from being a normal teen. Through her sniffling and crying, she said that I did not understand.

As I sat next to her, I was just speechless and heartbroken. I did not know what I could say to fix it. I again apologized and told her that I did not know about her situation and that I was sorry. I told her that if I had known, I would have been able to support her and find ways to accommodate her. I said that I wish I could take back what happened and I still wanted to help support her through this ordeal. Adhira slowly regained her composure and started to collect herself, still sniffling and with tears still running down her face. Adhira did not say anything; she slowly got up, grabbed her stuff and left.

The following day, Adhira came to class on time. I continued to teach the class lesson and treated her like any other student. I wanted to give Adhira some space because I was in the wrong for making her cry. At the end of class, I spoke to Adhira and again apologized to her. I told her that I was disappointed for letting her down and making her cry. I offered to allow her to re-do any assessment she wished, since these grades were not a reflection of her and were impacted due to situations involving her parents. Adhira accepted my apology and thanked me. She told me that she did not want to be treated differently from other students. In my response, I told her that no teenager should be dealing with what she faced so far. I told her it was admirable that she felt responsible for her family. I pleaded with her to use this opportunity to earn a better grade for university admissions.

The following days after this conversation, Adhira made plans to re-do certain assessments for a better grade. As grades started to rise, Adhira regained some of her previous confidence. By the end of the semester, Adhira's grades were in the high-70% range. Although her Grade 12 marks in physics would be different than her grades in Grade 11, I said to Adhira

that Physics 12 was much harder than Physics 11. Overall, from what Adhira shared, she was satisfied with the final grade.

I recall Adhira's last week of school being celebratory and an achievement for graduating high school under difficult circumstances. During Adhira's graduation day, I was able to meet with Adhira's family for the first time, shook hands and had group photos with Adhira and her family. My experience with Adhira would be one of the most memorable and positive ones in my career.

Learning from Adhira

In looking back at Adhira's journey, Adhira started off with a very high-degree of grit. She was determined. She always put in tremendous efforts to grow. Whenever she had difficulties, she always found ways to overcome such challenges. In all, Adhira's grit was constantly evolving. Through reflection, I realized that one of the most pivotal moments that significantly derailed Adhira's grit was her attention being diverted to her family, specifically, Adhira acting as a translator between her parents and medical professionals. Adhira had all the right traits for high levels of academic success; yet, such familial issues acted as a hindrance on Adhira. It is worth noting that other familial issues may come to play when one investigates a student's grit (e.g., language barriers, economic status, family compositions and more).

Adhira also taught me the importance of social connectedness when it comes to students who are not native-born. For example, in reviewing the story involving Ming, Xiao and Aisha, all three students were either recent immigrants or international students. As a result, they did not have the social connections that other students had. If Adhira did not build connections with them, all three students may not have experienced a greater level of success than if they were on their own. Adhira was different than Ming, Xiao and Aisha in that she was able to adapt between

Canadian culture and her Indian roots. Her adaptability was significant in her overall grittiness and scholarly success.

The Story of Violet

Encountering Violet

Fresh into a brand-new school year, I first met Violet in my Physics 11 class in the first semester. At the beginning of every semester, I begin my quest of getting to know my students, know their hobbies, interests and personalities. But, most importantly, I try to understand each student's habits. I want to know their strengths, what their weaknesses are, their ability to think logically and their willingness to do additional practice work. Looking back towards Violet, Violet was a very quiet person. Whenever we had classroom discussions about a topic or problem, she was unwilling to participate or engage in discussions. When I think back about my early experiences with Violet, I recall a girl who was very shy, never asked clarifying questions or engaged into any conversations with the other students in class.

In my teaching experience, I have had both introverted and extroverted students. Some students exist at each end of the spectrum. It is important to note that both types of students are equally as likely to be successful or unsuccessful. Therefore, being extroverted does not necessarily guarantee success. Therefore, as much as I ask students to engage in the classroom discussions, I also encourage students to come and see me on a one-on-one basis so that they can express their knowledge and comprehension. That way, I can fix any mistakes, errors or omissions that come out.

In class, I always observed Violet engaged in her class materials. She was never on her smartphone, never a disruption and was always focused on my class. In all, she was a keen but very shy student. Like Caleb and Adhira, the first few assessments focused on building core

concepts. It was also focused on developing every student's sense of confidence and accomplishment. By the first week of September, Violet had completed a homework probe and done well. Her score was high enough to earn stickers but not enough to earn a sticker bomb.

At the time, I only intervened with students who made less than 70%. The lower the grade was from a 70%, the more likely I would intervene. I remember coaching my class on their journey of learning. I said to my class that their first homework probe was their first kick at the can. I explained that it is important to know where they went wrong; that way, they do not repeat the mistakes in the future. I also reassured students by offering a second opportunity to make up these grades. In trying to inspire students so they could perform better, I asked them to come speak to me if they wanted to improve. Through a one-on-one conversation, I could give them feedback so they know what to do to see more success.

Fortunately, all the students who felt like they did not perform nearly as expected came to obtain the solutions. Some students would also ask for further practice problems to improve. I recall Violet asking me where she went wrong. As we spent a few minutes together going through the mistakes and providing her with areas of improvement, I could tell that she was getting it. Others came to see me, as well, and I repeated the same process with them too.

By the third week of September, Violet had completed a second homework with decent grades, again, this time with a sticker but not enough for a sticker bomb. I recall running the first major lab in Physics 11. The labs in Physics 11 differed from what was expected in Grade 10 motion labs. For instance, I emphasized the use of computer sensors and graphing technology. I also ensured that students were aware of instrumentation errors and how to analyze their data through computer programs. Essentially, my goal was to teach students the necessary skills for future careers and post-secondary learning. Because of the in-depth nature of these labs, it gave

me an opportunity to work directly with smaller groups of students. It also provided me with an opportune chance to become better acquainted with students in a less formalized context. Upon completing the lab, students passed in their data and must do individualized lab quizzes. The lab quizzes were essentially an individualized report that was done in class, based on the observations and data retrieved from the lab. To my surprise, Violet earned her first sticker bomb on this lab quiz. She was very pleased with herself, as was I.

Getting to Know Violet

By late September, students had completed two homework probes and a lab quiz. I felt that, based on their progression, Physics 11 students learned half of their Unit 1 outcomes. Therefore, a mid-unit quiz was more than appropriate before we went any further. In my class, I tell students that their mid-unit quiz feels like a unit test. It has multiple-choice questions, it assesses theory and practice problems, and it has a blend between general knowledge problems, application problems and in-depth analysis problems. It is also their second chance. I format the mid-unit quiz to look like the unit test. Therefore, I tell my students that, through exposing them to such formats, they will be better prepared when they write the actual test.

I also emphasize to my students that, while the mid-unit quiz is open-book and open-notes, it is still challenging if they do not study or examine where they went wrong on their past homework probes or lab quizzes. I also tell students that there is a time limit and to avoid being overconfident because they have access to all their notes and materials. From my past experience teaching former Physics 11 students, students who crammed a few days before did not always succeed with stellar grades. Therefore, I always tell students to study as early as possible.

In the days leading to the mid-unit quiz, many students came to me and asked for feedback. Some students mentioned about their anxiousness towards the mid-unit quiz and, so, I

provided these students with tips and advice. I asked students to think of their mid-unit quiz as three homework probes put together. That way, the thought process would be one that resembled a lengthier homework probe. By adjusting to this mindset, they will be able to overcome their anxiety and be successful. Finally, I advised students that, if they needed further feedback or advice, they should speak to me.

A standard practice in my class is to grade all my students' assessments and give students feedback within two to three classes. That way, students have quick and immediate feedback on their ongoing performance. It also allows me to quickly intervene when students perform poorly. On the mid-unit quiz, Violet earned a score of 59%. This was significantly lower than the class average. It was clear that students who did not seek feedback, seek extra help or have poor behaviours were the ones who performed poorly. I was genuinely shocked with Violet's score. Violet never exhibited any negative behaviour. She was quiet, but she always took notes, asked me questions one-on-one and was never on her smartphone. The only thing that she did not do was request an extra help session.

Upon providing all the mid-unit quizzes back to students, I asked Violet to go into the hallway for a private discussion. I shared with her that, while the quiz was not as great as anticipated, she could do better. Violet looked genuinely upset with her performance. Although she was not crying nor had any tears in her eyes, Violet's shoulders were slumped and her head was looking down. She only looked up to talk. In providing a possible rationale for her lack of success, I suggested that anxiousness may have been a factor. After a moment, she admitted to me that she was very anxious throughout her quiz. Violet revealed that she often second-guessed herself. She would write something down, erase it and write something else down. In all, she was not very confident in her abilities.

In trying to remedy the situation, I offered Violet one-on-one extra help. I suggested to her that, through such mentorship, I could help develop her skills, give her similar quiz questions and help build her confidence for the upcoming test. That way, when such questions would re-appear, she would be prepared. Violet nodded and thanked me. Before letting her go, I reassured her that being anxious was completely normal. I also tried to make her feel better by suggesting that this was her first time doing actual physics. I shared my belief that, if she put in time and effort, she would be able to overcome such challenges on the upcoming test.

One of the ways I try to help students grow is by reinforcing their belief that their past actions, experiences, mistakes and grades have no bearing on what I think of them. As a teacher, I have access to students' historical grades, their past grades in other classes, what courses they took and other relevant information, including student accommodations, individualized plans and other exam data. I always tell students that I avoid looking at their past historical records unless they have required accommodations. I avoid such information because I do not want their history biasing my perception of them. As a caveat, I only review such information if an individual student consistently performs poorly.

In Violet's circumstance, I was curious to know how she performed in her Grade 10 academic-level mathematics course. Traditionally, I review students' grades from their academic-level mathematics course because the materials, outcomes, rigour and challenge taught in Physics 11 resemble, very similarly, their Grade 10 scores. Therefore, in my experience, students who do well in their academic-level mathematics course in Grade 10 typically do well in Physics 11. When I reviewed Violet's Grade 10 mathematics score, it was low. Her scores were in the mid-50% range. This was concerning to me because it could explain why she performed so poorly on her mid-unit quiz. Reflecting on her mid-unit quiz, many of her mistakes

occurred from higher-order application and analysis problems. She also frequently made algebraic mistakes, thus, impacting her answers. In looking deeper at Violet's records, her file did not show any accommodations or adaptations.

Equipped with this knowledge, I once again spoke privately with Violet in the hallway. I opened the conversation by reminding her about the upcoming test. I inquired as to why she did not come for extra help. As we spoke, she said that she preferred reviewing things on her own. I shared my disappointment and noted that I was hoping to help build her confidence so she would perform better on her test. She did not have a response. I decided to tell her that I reviewed her past Grade 10 math marks. Violet was shocked. She was taken aback that I had done so. I told her that I needed to review her previous math grade because, typically, students who do well in Grade 10 math typically do well in Physics 11. I said that her previous Grade 10 math score was not as high as I had originally believed.

Violet immediately covered her face. I did not expect that. Violet did not cry or say anything. I interpreted her reaction as being embarrassed and, so, I told her not to feel embarrassed. I shared with her that I only reviewed her past grades because her recent quiz had many algebraic mistakes. I told her I needed to know this information so that I could help provide proper interventions to guide her through. Violet slowly uncovered her face. She admitted to me that her Grade 10 math experience was very poor and she had a very difficult time. She said that she always spent all her time in extra help and, as a result, it ate all her free time. She also revealed that, in her previous year, her mom hired a tutor for her so she could succeed in math. As we talked, she said she did not realize physics would have a lot of math. To reassure her, I provided her with the range of math concepts needed for physics. But, I encouraged her not to treat her physics experience like her math course. In providing a remedy, I

reinforced my belief that, if she worked with me, she could experience much more satisfaction than she did last year. She nodded and agreed.

I continued to ask her follow-up questions so I could get a better understanding of her academic challenges. I had asked her if she had been printing off her class notes. In my physics class, there are many in-depth concepts and materials. To help students better organize their notes, I place organized information, example problems, diagrams and pictures to help enhance students' learning. Because of the vast amount of notes written on PowerPoint, I always encourage students to print off their class notes so they can write additional notes that I put on the whiteboard that are not present in the printed notes (e.g., solutions to class examples, additional reinforced wording and contextual diagrams).

Sometimes, students do not listen or follow through on my suggestions. Such students copy down every word from the PowerPoint, try to draw the diagrams and, at the same time, try to write down things I vocally emphasize. In my experience, this often causes students to become overwhelmed and many are unable to sustain this significant amount of focus or note-taking. Therefore, I encourage students to visit me or go to the school library to print off their notes if they do not have access to a printer.

In Violet's circumstance, she admitted to not printing off her class notes. In that moment, I was stunned. I was under the impression that she had been printing off her notes. But, it was clear that, for some time, she did not have any printed notes. I immediately emphasized to Violet the importance of printing off the class notes. I shared with her that I often see the grade variations between students who do have printed notes and those who did not. I pleaded with Violet to print off her notes so she would not fall further behind.

As Violet returned to the classroom, I made a note that I should contact her parent(s) or guardian(s). I wanted to establish my contact with her family early. That way, I could build rapport, and provide tips and strategies for improvement. I waited till my preparatory period to contact home. During my preparatory period, I opened PowerSchool and I noticed that Violet's mother was the only listing for parental contact. As I picked up the phone and dialled Violet's mother (Elizabeth), I waited, but had to leave a voicemail. On the voicemail, I introduced myself and shared my reason for making contact. I mentioned Violet's poor academic performance on the most recent mid-unit quiz. I said that I wanted to discuss with her some tips, insights and strategies to help Violet improve. I also shared with her that I would send her an additional email to let her know that I called. In closing, I shared my preference for talking on the phone so she could hear the tone in my voice. I provided my contact information and wished her a terrific day.

After I hung up, I sent Elizabeth an email with the exact voicemail message. Less than five minutes later, I received an email from Elizabeth. She thanked me for the message and asked me, if it was possible, to contact her after school. As the day ended, I promptly called Elizabeth. Elizabeth picked up and I introduced myself. As we spoke, she formally referred to me as "Mr. Ngo;" however I asked her to call me by my first name. I wanted to be equal partners with her and, so, I shared my belief that we could work together and be equal partners in Violet's success. Therefore, formalities are not needed. I went on to update her regarding Violet's academic performance. I said that Violet had a lot of room to improve but she needed to follow through on certain tasks to see increased success. Elizabeth was aware of Violet's grades and was surprised that she performed so poorly. She thought that, because Violet had good grades in Grade 10 science that it would transfer to Physics 11.

As we spoke, I shared the structure of Grade 10 science. I also said the materials in the physics section of Grade 10 science were not very reflective of the concepts taught in Physics 11. The concepts are very basic. I provided my list of interventions, offering extra help and one-on-one support. Yet, I revealed to her that, although Violet does ask questions from time to time, she rarely spent any time during extra help. I offered one-on-one support for Violet as a way to help her improve. Elizabeth agreed and shared her appreciation. Elizabeth revealed that Violet was very shy and that she does not always ask for help as she should but she will encourage Violet to seek out the necessary supports.

Regarding the issue of class notes, I informed Elizabeth of my conversation with Violet. As Elizabeth inquired about the classroom instruction style and purpose of the class notes, I provided her with some of my observations of Violet. It made sense to her that one of the reasons for Violet's struggle was because of the overwhelming class notes. Elizabeth said that she would encourage Violet to print off her notes. In closing, I thanked Elizabeth for her time and I reaffirmed my commitment to partnering with her on helping Violet succeed.

The following week arrived, and Violet started to ask more questions. Although it was infrequent, she asked more than she normally did. I conducted another lab and Violet's work was exemplary. This time her score was a 100%. I made an announcement to my class to remind them of their upcoming test. I listed on the whiteboard the focus questions that they needed to study for. I also allowed students to use a standard double-sided cue card so they could put notes on to carry into their test. To incentivize their success, I said to students that, if they earn more than an 80% on their unit test, I would allow them to drop their worst heavily weighted assessment.

In this context, I wanted students to know that this summative assessment provided the final kick at the can. To encourage growth, I allowed the dropping of their worst heavily weighted assessment. I wanted students to have an opportunity to fix up any final mistakes before moving on to the next unit. I always encouraged ongoing growth and continuous learning and, therefore, I often reminded students about their journey of learning and reminded them to learn to fix past mistakes and overcome obstacles that prevented growth. Additionally, I tell students that, when they learn to follow such routines, they can experience lifelong achievement.

In the days leading up to the unit test, Violet finally came and asked me for one-on-one extra help. Although I was happy to see Violet come and ask me for help, I was a little frustrated that she waited until the very last minute. Still, some success was better than none. As I provided Violet with assistance, I gave her some similar questions to the test. She tried them and struggled. I provided some tips and strategies and asked her to practice some more questions. During the session, I asked Violet if she had adaptations. She did not know what adaptations were and, so, I provided her with a brief explanation and gave her some examples of possible accommodations that may be helpful in promoting her chances of success.

I asked her questions regarding her previous testing experience that dove deeper into her test anxiety. She told me about the time limit issue and stated that, as time ran out, she became even more anxious. Through such anxiety, she revealed that she kept on second-guessing herself and, as a result, became overwhelmed. To reduce her anxiety, I offered her additional time for her assessments. I also offered her an alternate location for testing so she would not feel different from the rest of the class. It was clear from Violet's body language that she showed a sigh of relief. She hesitated after it sank in. She asked if it was okay because she did not want to be different from other students. I reassured her by saying that many other students have

documented adaptations. In wrapping up our conversation, I said that, if these adaptation strategies work, I would like to start the process of formally documenting it so she could be offered such strategies in other mathematics-related classes.

On the day of the unit test, Violet came to class and picked up her test. I brought her to the alternate setting and gave her some tips, advice and words of wisdom. I encouraged and supported her by giving her positive reinforcement. I also said that I would frequently check in on her so that she can continually ask questions if she needed to. During the test, I periodically checked in on Violet. It was clear that giving her more time was helpful because she did not seem nearly as tense as before. However, it seemed like she would frequently second-guess herself. Whenever Violet stumbled onto an unfamiliar question, she either blanked out or spent much of the time writing something down, then erasing it. I remember seeing a pile of eraser shavings all over her desk and her hands covering her face. I asked Violet if she was okay, but she admitted to blanking out. She asked me to give her some hints, but I had to refuse. I said to Violet that I had to be fair to the other students and therefore, I suggested to her to review her cue cards and reflect on the practice problems we did together. In the end, Violet's grade was passable, with a 59%.

Elizabeth would email me the following day I released the grades. She asked me to call her. As I called her, I re-introduced myself but I noticed an entirely different tone in her voice. I felt uncomfortable because she said that she was disappointed with both Violet and me. She was under the impression that, because Violet spent so much time with me, she would be much more successful this time around. Elizabeth vented her frustration. She said that she observed Violet spending hours on end doing physics, yet she continued to fail. I remember slumping into my office chair with my right hand in my hair and my left hand holding the phone. I gave a long

sigh. In sympathizing with Elizabeth's point-of-view, I shared my frustration with Violet's grade as well but also emphasized that I was on her side. I told her about Violet asking me more questions. But, I admitted that Violet should have came to ask for extra help sooner, instead of waiting a few days prior to the test. I shared my belief that, if Violet had asked me for help sooner, I think it could have been a much better result. In the end, I told her that I wanted all my students to be successful and that it does me no good when students perform poorly.

I noticed the intensity of the conversation simmer and I felt that she understood my point of view. In ending the conversation, I asked Elizabeth if she was aware of adaptations. She informed me that she did not know about adaptations or the adaptation process. As I provided her with a detailed explanation, I also shared with her that I provided certain adaptations to help promote a greater chance of success for Violet. I told her that the adaptations helped reduce her test anxiety and, while my adaptations were informal, perhaps she could speak to Violet's guidance counsellor regarding formalizing her adaptations in other classes. Elizabeth ultimately thanked me for the conversation and, before I let her go, I reinforced my belief that Elizabeth has much potential to improve and grow.

Several weeks after my uncomfortable conversation with Elizabeth, Violet continued to maintain some achievement towards her homework and her lab quizzes. Violet asked me more questions, requested feedback and spent more time during extra help. What surprised me the most was Violet's commitment to performing better on her assessments. Although she struggled to get a sticker bomb, she did receive stickers on many of her homework probes. By midterm, Violet completed her mid-unit quiz for the second unit. Although her grade was a 64%, I felt it was an accomplishment because the materials had connections from the previous unit.

Violet felt let down. In class, she shared with me that she felt prepared and studied very hard. To my surprise, Violet started saying self-defeating words and often put herself down. She kept on saying that she wanted to give up and drop physics entirely. I asked Violet to go into the hallway so I could speak to her privately. As I walked into the hallway, I saw Violet covering her face and her shoulders were slouched down. I said to Violet that, although she did not perform nearly as well as she had hoped, I was very proud of her recent achievement. I took out a sticker and stuck it on her paper. I told her that, while her grade was not a 70% or higher, the materials she faced were much more difficult and had connections to her previous unit. In trying to encourage and motivate her, I told her that she performed significantly better and that I was thoroughly impressed with her miraculous growth. I said that I would be calling her mom and letting her know.

Violet uncovered her face a bit and began to smile. She said that she did not want to let me down. I told her that I was very proud of her because she worked so hard. I also said that I believe she was on the correct path for success. Later in the day, I contacted Elizabeth and relayed her good news. I told her that, sometimes success is measured by grades when a student earns a high 80%, 90%, or even a perfect score. However, I emphasized that, while Violet did earn a 64% on her recent quiz, her overall growth was far more important than grades. I outlined examples where Violet improved, from demonstrating significant effort, to asking more questions and, finally, her overall persistence. I said to Elizabeth that I was happy and proud to see Violet's progression.

I think this was the point where my relationship with Elizabeth went from being uncomfortable to slightly more positive. I had expected Elizabeth to say something different around the lower grades. But, she acknowledged the small, measured success was better than

expecting gigantic leaps. Elizabeth thanked me for supporting her daughter and reaffirmed her commitment to support Violet and me.

As the weeks wore on, Violet struggled here and there. Every time she suffered a lower than expected grade, I would see her shut down. In class, she would put her arms together and collapse her head into the desk. She would cover her face. She would often say self-defeating words like, "I suck at physics," or "I should drop physics." I know Violet had worked very hard and continued to persevere. There were days that she looked like she was going to give up. At the end of the second unit, she earned a 64%. I still felt like she was on the correct trajectory. When I compared her test grade to her first test grade, it was clearly an improvement.

The Expense of Success

By November, working with Violet on a near daily basis started to take its toll on me. Although Violet would not be the only student with high needs, I felt burnt out that I used every lunch hour to help Violet. There would be days where Violet would arrive at school thirty minutes early to ask for help and I would drop everything to help her. It would come at the expense of doing any administrative work. Such administrative work would be transferred into my off time or at night. I was constantly busy. I wanted to ask Elizabeth to obtain a tutor for Violet. But, through my consistent effort working with Violet, I noticed that Violet went from being a very reserved and quiet student to one who became more expressive, sociable and willing to try, even at the expense of failing. I was worried that, if Violet got a tutor, it might backfire. To me, I believe that Violet was experiencing so much success because she had a very positive relationship with me. Ultimately, Violet was comfortable with my guidance. Therefore, I felt like this was a cross that I must bear if I was to see her succeed.

As Violet became more expressive and sociable, my relationship with her blossomed, as well. Violet would often share her interests and hobbies with me. She also shared that she had a part-time job working retail. She was an avid player of ultimate Frisbee. All these activities were unbeknownst to me. I recall mentoring her about maintaining a balance between school, sports and her job. She shared with me that doing sports and working gave her an outlet for stress. She reassured me that she would not let it interfere with her schooling. As we got to know each other, I asked her if she knew her pathway for post-secondary schooling. Violet admitted that she did not know. Therefore, I said to her that I would reflect on her interests and hobbies to see what potential ideas I could guide her for potential schooling.

As Violet continued to progress, I started to notice an increasing frequency of sticker bombs. I recall giving her a homework probe with a sticker bomb. Violet was in shock and was so happy at the same time. Violet did not make a big public viewing of her achievement. She was clearly proud of her success and she was elated. Later in the day, I received an email from Violet's mom thanking me about the sticker bomb. She said that if it was not for me, Violet would not experience success. I felt differently. I felt it was a team effort and, therefore, I emailed her back and told her that I was simply a mentor for Violet and that Violet's overall achievement was due to her own dedication and persistence. I said to Elizabeth that I was very happy to see Violet's continued success.

At the end of the course, I was very tired but happy at the same time. It was a bittersweet moment knowing that Violet was finishing Physics 11 on the right footing. I was proud of her for earning a 73%. I knew she struggled, but she tried. Violet came to see me and asked if she should continue into Grade 12 physics. I was stunned that she asked me this. At the time, I felt it was all about self-preservation. By this point, I was literally spent. I spent every ounce of free time

working with her one-on-one. I was burnt out, tired and did not want to repeat this process next year. I am embarrassed to write this but it is important to share. In every way possible, I tried to discourage her from taking Physics 12 without explicitly saying it. I told her that Physics 12 was far more challenging than Physics 11 because the mathematics would be much harder and the concepts would require a lot of higher-level thinking. I said that I did not recommend Physics 12 for her but, ultimately, it would be her choice. I said that she would need to put a lot more work and effort into it. I also asked her to consider her university transcripts. A poor grade would not bode well for her.

Years after teaching Violet, I am still embarrassed that I discouraged a student from taking a course. Violet clearly tried. She took every opportunity to succeed. How do I have the right to turn my back on a student who literally wanted to learn? At the time, I felt it was reasonable advice. I felt the context of providing direct one-on-one support was a major contributory factor to her success. I was simply burnt out and I knew that, if she continued into Physics 12, I would need to spend significantly more time helping her. I was anxious about the thought of more burnout. In retrospect, my continued experiences with Violet significantly added to my outlook on grit and student success.

A New Semester with Increasing Degrees of Growth

The very following year, Violet appeared in my first semester Physics 12 class. As she entered the room and sat down, I was shocked and taken aback. Violet enthusiastically greeted me. I hid my reaction, smiled and welcomed her back to class. As class started, I provided students with the usual opening day class routines. We did some basic materials and ended the class. Before Violet left, I asked to speak privately with her. I welcomed her again and provided

a brief recap of what transpired last year. I reminded her of the challenges she would face and the difficulties she may experience. Ultimately, it would be more difficult than Physics 11.

Again, without explicitly saying it, I was guilty of trying to convince her to not take Physics 12. For years, I felt guilty and selfish for trying to convince her this way. I wanted to have an easier time. I simply could not handle her eating up all my valuable time during the mornings and every lunch hour. There were days where I would skip eating to help others. Other times, when it got busy, I struggled to keep up with my responsibilities. After trying to convince her, Violet continued to insist that Physics 12 was right for her.

It was almost immediate that Violet's first few assessments were poor. She earned a 61% on her first homework probe and the next two assessments, a homework probe and a lab quiz, were failing grades. Violet continued her strategy of asking questions and working with me during extra help. As amazing as it was for her to utilize such resources for help, it was difficult for me because other students needed help and I could not devote significant amounts of time to help Violet.

I decided to reach out to one of my former students in the previous year. His name was Faisal. Faisal was enrolled in my International Baccalaureate (IB) physics program and earned top scores in Grade 11. Faisal was like Violet. Faisal was very hard working, quiet, articulate and extremely dedicated. Whenever teachers talk about Faisal, they shared nothing but the best. Faisal never showed off and was very mindful of others. I knew that Faisal needed to complete a certain number of volunteer hours to satisfy his requirements for his IB diploma. Therefore, I asked him if he was willing to tutor Violet. I gave Faisal a brief backgrounder of Violet and reassured him that she would not waste his time. I reiterated Violet's friendly personality and willingness to learn.

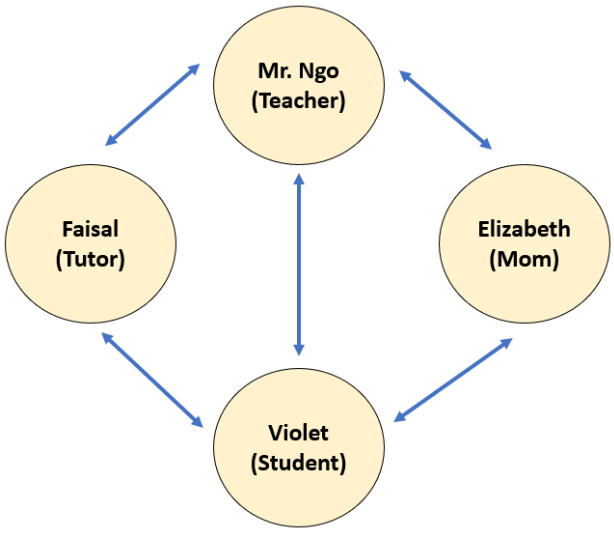

Figure 6. Sociogram of Violet's relationships in her Physics 12 class.

Faisal agreed and was happy to volunteer his time to help Violet. I planned to have Faisal meet with Violet. The introductions went smoothly. I also reached out to Elizabeth to offer Faisal as an alternate person to help Violet. I mentioned to Elizabeth that I spent a lot of time working one-on-one with Violet in the previous year. I mentioned the difficulties in spending significant amounts of time with Violet because of other demands and other students' needs. I told her that I found a volunteer tutor for Violet, and shared Faisal's educational background and his motivation for helping Violet. I also said that I was willing to brief Faisal on Violet's challenges and, that way, Faisal could help Violet be successful. I asked if that was okay. Elizabeth was very happy of the offer and thanked me for looking out for Violet.

As the weeks went on, Violet's grades fluctuated from lower-than-expected grades to above-average grades. I checked in on Faisal to see how Violet was performing. Faisal briefed me on their progress and mentioned that they meet after school several times a week to study. Faisal mentioned that he is also getting a lot of benefit from the experience because some of the materials Violet was learning were not part of the IB Physics 12 curriculum. I was pleased to hear that Violet was still committed to her pursuit of academic success.

My Epiphanies Related to Violet

Although Violet spent considerable amounts of time working with Faisal, I had some opportunities to work with Violet here and there. Through my time working with Violet, I was thoroughly impressed with her progress. The previous year, Violet's notes and materials were all over the place. When I examined her notes in Physics 12, she clearly had a system in place. In every physics problem she tried, she did all problems in a logical and methodical manner.

I was very impressed with her grit. I shared with Violet about my research on grit and how Violet clearly exemplified the spirit of grit. Violet was very happy with such recognition and was positively beaming. I told her that, whenever she faced challenges, she faced them head-on. While she stumbled last year and wanted to quit, she did not. I felt like that was worthy of recognition. I reminded her that she always tried and found strategies to improve. Even through adversity, obstacles and defeat, she kept on running.

Violet was ecstatic but was very humble. I was thoroughly impressed to see her progress in this way. In a short period of time, she proved me wrong by excelling in Physics 12. On her first unit test, she scored a 93%. I could not believe it. How was I so wrong in the beginning? This epiphany totally changed my demeanour, and it humbled me. If a student was willing to take a challenge head-on, why do I have the right to stop them? Yes, I might not be able to help them directly, but I can surely find ways to help support their growth.

As I would continue to have my weekly updates with Elizabeth, I reiterated my shock and awe with Violet's improvement. I was thrilled to see her blossom. Violet continued earning higher grades, earning many sticker bombs. On the following unit, Violet earned an 83%. The unit was very tough. It was clear to me that Violet was becoming more invested in her growth.

She became more fascinated with the materials and often said to me that she thoroughly enjoyed doing physics.

In checking with Faisal, I thanked him for his work with Violet. I briefed Faisal on Violet's recent achievements. I explained to him that Violet was originally one of my weaker students; yet, she was now one of my top performers in the class. Faisal was as humble as Violet. He admitted that he did not do too much. But, he revealed to me that over the past two weeks, Violet gave up on the tutoring sessions. I was floored and had another shocked moment. I asked Faisal to repeat his last statement. Faisal nervously replied, as if he thought he did something wrong. He explained to me that Violet did not reach out for tutoring and he did not press the issue. To me, Violet was doing well, did not need any support and was truly independent.

The following day, after talking to Faisal, I saw Violet. I congratulated Violet on her amazing grades. I told her that I found out that she stopped seeing Faisal. Violet immediately covered her face. She looked embarrassed because she slowly turned red. I continued my conversation. I told her not to be embarrassed. I said that I was amazed that she was doing so well without support. I reiterated and jokingly chuckled that I was not mad but was very impressed. She uncovered her face and began to smile. She told me that she felt comfortable with the materials and did not want to waste Faisal's time. However, she did mention that she would continue seeking support if she ran into difficulties.

Towards the end of the semester, it was clear to me that Violet was going to be one of my top performers in Physics 12. Time started to free up and I had more time to work with my students. I reached out to Violet and asked her if she applied to university. She did not. I offered to spend some lunch hours with her to help find some pathways for post-secondary education. I reminded her of her stellar achievements and her success. I gave her some of my insights and

ideas for university programs. Violet was incredibly happy and grateful because she was not sure what she would do in the future. Therefore, we decided to meet on the following day to plan for her post-secondary education.

The following day, I met with Violet and told her again that I was proud of her. I informed her that she was going to be one of my very top students for Physics 12. I asked her to reflect on her journey from Physics 11 to 12. I reminded her of her struggles, but reiterated my point that she is now one of the top students. I told her that I was so impressed with her that I often share my experiences of her with other teachers. The stories I shared with some teachers often left them speechless.I always found it funny that Violet's instant reaction to any sort of praise or criticism would be the covering of her face. As she covered her face, she brushed her hair to the side and told me that her journey was a difficult one. She appreciated what Faisal and I had done to support her. She thanked me for believing in her. My heart broke. Again, deep down, I knew that I had tried to discourage her from taking Physics 12. Yet, I felt that this was a learning experience for me. If someone like Violet struggled so much and continued to try, why should I prevent them from trying? By the end of our meeting, we came up with Kinesiology as a possible career. Kinesiology tied her interest of physical activity, ultimate Frisbee and physics all together.

At the end of the semester, Violet earned a score of 85%, making her one of the top performers in my class. In the final email contact I had with Violet's mother, Elizabeth said:

> I just wanted to say one more time how much I think Violet has benefitted from this experience she had with you in your classes. Nothing came easily to her, and even though there was a lot of anxiety and complaining, she persisted and did not drop the class. She did something even I, as a youngster, never attempted because I knew I wouldn't do well.

> I read a blog every day by a man named Seth Godin, and very appropriate, today, he said, "It is not a race, it is a journey." I'm trying to show this way of thinking to Violet about school and about life. Despite the demands for marks and other people's expectations, she learned things about the physical world that she doesn't even realize she learned. She learned how to cope with difficulty. In the end, I say this experience was very worthwhile.

Learning from Violet

Violet's journey in Physics 11 and 12 taught me so much about grit and student success. For Violet, grit was an ever-evolving trait that grew. It came because of numerous interventions, experiences, and support. Most critical to Violet's development of grit was Violet's mindset. In the beginning, Violet appeared to have many signs of neuroticism. Violet's self-defeating words and attitudes caused her to have major setbacks. There were also negative experiences in her past that contributed in Violet's poor performance (e.g., her experiences in Grade 10 mathematics). However, through the teacher-to-pupil mentorship, I was able to work one-on-one with Violet to build structures to help support Violet. By changing her mindset, finding accommodations to help support her learning and getting her to reflect on what it means to be successful, Violet slowly changed and became more motivated to seek out progressive ways to succeed.

Another important factor that contributed in Violet's success was teaming up and partnering with Violet's mom, Elizabeth. I believe that Elizabeth originally confused success with grades. By changing Elizabeth's mindset regarding success, it ultimately contributed to Violet's growth. As Violet mentioned, she did not want to disappoint me. I also believe that Violet did not want to disappoint her mother, either. Therefore, through such parental support

and collaboration, I believe it significantly helped foster an environment that truly supported Violet's growth and overall success.

Conclusion

In my years teaching physics, I have had many experiences and stories with a great number of students. However, the stories I have shared regarding Caleb, Adhira and Violet would be some of the most profound experiences. Caleb's, Adhira's and Violet's stories revolved around the nature of grit and student success, however, each of their stories leading to grit and student success slightly differed.

The basic tenants in all three of my stories revolved around the notion of mindsets, personalities and motivation. While Caleb's and Adhira's stories centred on social structures, Caleb's story was unique, due to the poverty that he faced and what appeared to be the lack of support he initially had from his family. Adhira's story was unique because of the issues around race and cultural issues. But, most importantly, it was Adhira's time, focus and energy being a translator for her family and a supporting individual that significantly altered her grit. Finally, Violet's story focused on the nature of mentorship, changing mindsets and the importance of parental influence on a student's grit and chances of success. It is important to note that, while many of these epiphanies were incredibly transformative, it had monumental effects to how I perceived grit and how I perceived success in my physics classroom.

Chapter 5: The Journey's Conclusion and Implications

Making Sense of the Story

In my years teaching Caleb, Adhira and Violet, each student provided me with invaluable experiences that not only radically changed my thoughts and perception of grit and student success but also transformed my entire teaching practice. Initially, through a researcher's lens, I tried to compare Caleb, Adhira and Violet's stories with different themes related to the literature review. In doing so, I felt like I turned all these experiences into data points. I wrestled with that fact and it did not sit well with me. I had believed that I turned each person into "impersonal subjects only to be mined for data" (Adams & Ellis, 2012, p. 206).

As I wrestled with how I would analyze my experiences and connect them to the known literature review, I had difficulty balancing what I felt was considered correct for research with what was appropriate for Caleb, Adhira and Violet. To that end, I wanted to pay homage to their invaluable experiences and hold their stories and experiences close-to-heart. I realized that Caleb's, Adhira's and Violet's journey of grit and success cannot be compared to one another since each of their stories brought unique and specific experiences within their own time and contexts. Also, each student brought different epiphanies that were transformative and life changing. Therefore, within each story, I analyzed the stories according to the frameworks that comprised the literature review.

Learning from Caleb

Analyzing Grit

In reviewing Duckworth et al. (2007), grit is defined as "perseverance and passion for long-term goals. Grit entails working strenuously towards challenges, maintaining effort, and

interest over years despite failure, adversity, and plateaus in progress" (p. 1088). According to Duckworth et al., an individual's grit score is made up of two domain-specific components. The first component is a consistency of interest score, while the second component is a perseverance of effort score. Individuals with a high consistency of interest score normally have a consistent focus on maintaining an objective or goal over time, despite any setbacks, distractions or new interests. Individuals with a high perseverance of effort score normally have a diligent, hard working, focused and goal-oriented attitude. Having seen the experiences faced by Caleb, Adhira and Violet, grit is far more complex than a simple eight or ten item survey suggests.

If I conducted a grit test on Caleb at the beginning of each semester and obtained a score, Caleb's grit would be low in both Physics 11 and Physics 12. Based on Caleb's grit test, grit alone would have mixed results in accurately predicting whether he would pass or whether he would fail. Therefore, there are a vast number of significant contributory factors that influence the degree of grit in individual students.

Grit has many traits, including the ability to sustain significant efforts, resiliency, passion, self-control, conscientiousness and ferocious determination, to name a few (Duckworth et al., 2007; Duckworth & Quinn, 2009; Hill et al., 2016; Hochanadel & Finamore, 2015; Muenks et al., 2017; Noftle & Robins, 2007; Rimfeld et al., 2016). When I critically reflect and think upon the traits of grit, Caleb initially did not meet any of these qualities. For instance, Caleb lacked self-control. While students in class were learning, Caleb frequently caused social disruptions that prevented his learning and, in doing so, disrupted the learning of others. Caleb also chose to disengage from productive learning activities (e.g., in-class homework and practice) when he felt the challenges were too insurmountable. Finally, Caleb frequently escaped the classroom. If I examined these factors alone, it was clear that Caleb had lower-levels of grit and, therefore,

would not be successful in physics. This was a fact known at the end of Grade 11 physics. However, there were other significant factors at play that explained his lower-levels of grit. While I initially began my journey fully accepting the construct of grit, as laid out to me, was infallible, the epiphanies related to my experiences with my students have provided a deeper and life-changing understanding of the significant factors related to grit that sometimes one may overlook.

I often wrestle with the circumstances around Caleb's grit in his Grade 11 year. How did Caleb suddenly gain significantly higher levels of grit in Grade 12? What factors changed in Caleb's life for him to become grittier and more successful? Perhaps, some of the answers lie in the examination of mindsets and the Five Factor model of personality.

Analyzing Mindset and the Big Five Factors of Personality

Rimfeld et al. (2016) describe the Big Five factors as "a central approach to the trait of personality—they constitute an empirically verified taxonomy of traits" (p. 780). Looking at Caleb's personality prior to his success during the COVID-19 pandemic online learning phase, I observed a student who was clearly extroverted and thoroughly enjoyed social situations. Success did not hinge on extraversion or introversion. In my classes, when students are actively participating in classroom discussions, they can communicate and process their understanding within a public forum. But, for introverted students, most times, students communicate their learning and understanding privately. Some show up at extra help or speak to me on a one-on-one basis. Therefore, regardless of the degree of extroversion or introversion, students who take charge and demonstrate responsibility appear to be more academically successful.

Caleb often tried to associate himself with other like-minded students. Even so, there were very few students that acted like him. As often as Caleb tried to bring out negative

attributes in others, many students remained focused on their academic achievement and tended to ignore him. As a result, the only student that Caleb was closely affiliated with was Phil. Therefore, Phil and Caleb were immediately separated to prevent classroom disruptions.

Throughout my time teaching Caleb, he never divulged personal details. Other than the rough and tough exterior that Caleb often displayed, I did not know much about him. The only information I gathered was through what other teachers shared, his actions in my class, what was on his personal record and through my experiences with Caleb's relatives (e.g., Caleb's mother and grandmother).

Caspi et al. (2006) describe neuroticism as negative emotionality. They describe neurotic individuals as seeing the world as threatening. Such individuals "are anxious, vulnerable to stress, guilt-prone, lacking in confidence, moody, angry, easily frustrated, and insecure in relationships; individuals low on this trait are emotionally stable and adaptable" (p. 457). Caleb never indicated that he had any mental health issues. Upon reflection, I suppose one of the reasons why he escaped the classroom so often was because he could not cope with the stresses of the class. Physics was extremely difficult for him. Caleb lacked the mathematics skills and lacked the habits of mind for a higher-level science class. Instead of admitting being overwhelmed, he continued to act out, escape the classroom and made poor choices.

In retrospect, I believe that Caleb explicitly avoided sharing his frustration with me. If Caleb admitted his difficulty with the materials, it may have impacted his persona as being someone who did not need help. Whenever I tried to assist Caleb in any strategies for academic growth, he rarely ever accepted. Sadly, through numerous failures, it was quiet suffering, helplessness and an inability to improve. Taking all these attitudes, signs and actions, Caleb appeared to fall into what Dweck et al. (1995) refer to as a fixed mindset.

By Grade 12, Caleb started to change his behaviour. Numerous factors impacted this change. But, most notably, he demonstrated a willingness to take ownership and responsibility for his actions. Maturity could have been also a contributory factor. One of the most pivotal moments with Caleb occurred when he acknowledged his immaturity in his Grade 11 year. He informed me that he goofed around far too much and did not take anything seriously. By taking ownership for his actions, Caleb started to show some indications of conscientiousness traits.

It was not just one instance of taking responsibility that led Caleb to see some semblance of academic success in Grade 12. On his own, Caleb no longer escaped the classroom and was always responsible with his time in the washroom. For me, I did not have to focus so much on his misdeeds. As a result, I was able to focus more on building up his weaknesses and encouraging him to be more successful. Whenever we had class, Caleb always joined in and expressed his point-of-view on the materials we learned. Although his statements would sometimes be incorrect, it was nice to see him direct his extraversion in a very positive way. Caleb's engagement was outstanding. In another pivotal moment, as we reviewed past concepts, he recognized that the materials were easier than expected. I believe success breeds more success. Success feels good and, through such active engagement, he appeared to demonstrate a shift in his personality towards scholarly work. Through such experiences, I believed Caleb was again showing and improving his conscientious traits and appeared to be developing signs of a growth mindset, as described by Dweck et al. (1995).

Caspi et al. (2005) and Poropat (2009) describe conscientious individuals being incredibly persistent in their tasks, responsible, independent and attentive. While the COVID-19 pandemic's online learning could have spelled disaster for Caleb, he continued to show

overwhelming dedication, grit and independence by continually attending online classes. He always took part in online lab activities, online assignments and extra help.

Conscientiousness is the best predictor for academic achievement (Dumfart & Neubauer, 2016; Ivcevic & Brackett, 2014; Rimfeld et al., 2016; Steinmayr et al., 2018). Poropat states, "[Students] who are low [in] conscientiousness would be nearly twice as likely to fail" (p. 328). It was clear that, by the end of Grade 12, Caleb was very conscientious throughout his online learning, which was mostly evidenced by him far exceeding grade expectations.

Analyzing Intrinsic and Extrinsic Motivation

When Caleb was in Grade 11, I often provided many different interventions to help him improve, such as coaching, peer-mentorship and flexibility in assessments. Yet, many of these interventions fell apart because Caleb did not appear to want the help. Near the beginning of Physics 11, Caleb earned a sticker bomb on one of his assessments. In addition to the sticker bomb, I also accompanied his achievement with positive comments. The sticker bomb and positive reinforcement not only provided a very positive reaction, but they also helped reduce Caleb's misbehaviour. Unfortunately, it was very short-lived and, within a few classes, Caleb not only lost his pursuit for academic success but he quickly reverted to his old ways.

Caleb's amazing reaction to the sticker bomb and the positive feedback provided me with an edge in managing Caleb's behaviours. It was evident that Caleb appeared to react positively to rewards and positive feedback. Whenever Caleb succeeded, I provided him with packs of gum or other treats. Such motivators are considered extrinsic because Caleb's motivation was to "attain some separable outcome" (Ryan & Deci, 2000, p. 60). There is something to be said about the powerful role educators and role models have on students. The genuine presence and positive constructive conversations that I had with Caleb significantly altered Caleb's experiences and

motivation in class. Perhaps, Caleb was looking for positive affirmation of his abilities from a respected adult. Without this positive affirmation, it may have led Caleb into a negative downward spiral. Ultimately, educators have an extremely powerful role in altering the trajectories of student achievement, success and grit. While it is difficult, particularly at the secondary level, due to the significant number of students in a teacher's course load, this also suggests that schools may need to organize themselves differently so teachers can know their students and, therefore, effect growth, success and achievement in all students.

By Grade 12, Caleb began to take more responsibility for his actions. As he continued to demonstrate better signs of academic and behavioural success, I provided him with frequent and meaningful positive reinforcement. It is important to note that I never provide positive reinforcement for the sake of doing so. Positive reinforcement needs to be provided in a genuine way and, therefore, in my opinion, if positive reinforcement is overused or students perceive it as less than genuine, it lacks its transformative power to encourage students to improve and grow. That said, for situations such as Caleb, it was important for me to dig deep and find some meaningful attribute to compliment him on. From experience, I often see students react very positively to such praise and this was the same with Caleb.

Monetary rewards from Caleb's grandmother were another external motivator that helped aid Caleb's overall academic and behavioural success. Von Culin et al. (2014) showed that individuals who were extrinsically motivated were less gritty than their intrinsic peers. I agree with these researchers' point about extrinsic motivation and grit. Many of the external motivators used were short-lived and it did not encourage long lasting growth. However, I also believe that, without the extrinsic rewards, Caleb would not have developed continuous improvement and

success. Sometimes, a behavioural intervention may require an extrinsic motivator to change a behaviour in a student. However, with time, it is important to shift such motivators to intrinsic.

Research suggests that the temperament and personality of individuals also factor into the degree of focus and grit of individual students (Cain, 2013; Von Culin et al., 2014). These researchers claim that individuals who are motivated to seek happiness and immediate pleasure may be less inclined to maintain focused interest over time and tend to be less gritty and their stoic peers. Such character traits involving individuals motivated to seek immediate pleasure are sometimes associated with extroverted personalities, whereas for those who are persistent and focused are sometimes characterized as introverted (Cain, 2013).

While there are varying levels of grittiness, I believe that, by building on a repository of ongoing achievement for Caleb, it helped motivate him to advance long-lived grit and success. For example, the COVID-19 pandemic's online learning could have easily detrimentally impacted Caleb. When the Department of Education and Early Childhood Development, the governing body that regulates education in Nova Scotia, announced that students' grades would not drop below their pre-closure levels, Caleb already passed the course. Still, Caleb continued studying and learning. The pass was satisfactory to many students who stopped online learning. Yet, at the time, I could not understand why he continued to study and learn. It was out of character for him. In deep reflection, I believe Caleb's engagement and continued pursuit for learning appeared to show Caleb's evolving intrinsic motivation. Caleb appeared to enjoy the experiences that came from being engaged and experiencing success.

There are varying degrees of motivation, which are influenced by a perceived locus of control (Ryan & Deci, 2000). Individuals with a high-degree of intrinsic motivation are individuals who experience satisfaction due to competency and autonomy (Ryan & Deci, 2000).

Intrinsic motivation is different than extrinsic motivation because, rather than doing an activity for some external reward, the activity is being completed for internal satisfaction (Ryan & Deci, 2000).

Looking back to Grade 11, I was always on top of Caleb. I always micromanaged what he did and controlled who he associated himself with. This was done to help put structures in place so he would not fail. However, in my reflection of motivation, this may have negatively impacted Caleb's locus of control and, therefore, may have been counterproductive to increasing Caleb's grittiness. In reflecting on Caleb's Grade 12 year, as soon as Caleb acknowledged his responsibility, I began to give him more control. I believe that, by giving Caleb more control, he started to exhibit more positive productive behaviours. He engaged in classroom discussions, accepted new challenges and was more involved with daily materials. Eventually, I took a hands-off approach as he continued to improve and do well.

Minor successes led to even greater successes in the online realm. In reflecting on Caleb's very positive experience with online learning, I can attribute his continued success to having even more control of his circumstances. Throughout Grade 11 and Grade 12, Caleb always kept up the appearance of acting tough and often avoided looking vulnerable amongst his peers. Caleb's reputation was very important to him and, as such, it likely pained him for not asking or accepting help. Therefore, it appeared that Caleb would prefer to fail rather than ruin his persona. I believe the external reward of acting tough was a social acceptance within the peer group to which Caleb belonged. The online learning environment provided Caleb with an opportunity to learn and succeed without impacting his facade. By having this control, he ended up doing well without others seeing his success. He could learn at his own pace, obtain extra help without others noticing and earn high scores without impacting his image.

Analyzing Social Structures

There could be numerous other possible reasons as to why Caleb was not successful in Physics 11. Caleb belonged in a school which served two distinct neighbourhoods. Some of the students in Caleb's school arrived from neighbourhoods with an affluent socioeconomic status. Such students had parent(s) or guardian(s) who were working professionals. Based on my observations, it appeared that students from higher socioeconomic status had a significant presence in school activities. Such presence included student government, school band, school sports, clubs, extracurricular and leadership activities. Other students in the school came from working class households. It is possible that some students from working class families may need to support their families with a part-time job. Others may have family responsibilities such as taking care of a sibling or managing the household and may not have the ability to be involved in school activities.

Literature from Apple (2010) and Gorski (2016) suggest that social class impacts schools and that schools, through all kinds of practices and expectations, do participate in social reproduction. That said, with this sense of social disparity, students from working class families may not feel the same sense of belonging as those students from affluent families and, as such, children of professionals are likely to be more successful academically than those from working class households.

When I reflect on the students in Caleb's Physics 11 class, many students were involved in extracurricular activities and, as such, those students had very close bonds with each other. Sadly, Caleb did not have connections with many of these students. Caleb's inability to form strong social connections with his physics classmates is reminiscent of what Gore et al. (2016) indicate. In addition to being actively involved in school, students who form connections with

other students, teachers, and staff, generally have shown significant and positive results. In my attempt to create situations and opportunities for social bonding, I could tell that Caleb worked well with others and some individuals were readily accepting of Caleb.

Unfortunately, after the bullying incident with Alice, students in the class tended to avoid Caleb. There was never any disclosure on my part with what happened to Alice. However, I believe Alice may have shared her bullying incident with her friends and, in doing so, caused Caleb to be further alienated in the class. Caleb may have performed poorly because of social isolation, negative peer interactions and the persona he wanted to maintain. However, when Caleb moved to online learning, it seems likely that he eliminated the social pressures and, as a result, became increasingly more successful.

Analyzing Income and Familial Structures

Every student who came to my class arrived with a different invisible knapsack filled with different advantages and disadvantages. McIntosh (2005) relates the invisible knapsack as a type of privilege that an individual "can count on cashing in each day" (p. 278). When I think about Caleb, I recall a student who had significant economic disadvantages. He also lived in a lone, single-parent household. Frank and Fisher (2020) claim, "children living in lone-parent families experience a much greater likelihood of living in poverty than children living in couple families" (p. 24).

It was clear that Caleb came to school each day with limited resources. While many students came to school using the latest technological gadgets (e.g., iPhones, iPads and powerful laptops), Caleb used an older generation iPhone. Not only it was an older iPhone, the screen was cracked and the front facing camera hardly worked. Caleb also did not have access to a laptop, which was problematic for homework. When the COVID-19 pandemic started, schools had to be

shut down. As a result, schools had to pivot to online learning. From my point of view, shifting to online learning clearly exposed the economic disparity for students in schools. For those who had access to economic resources, such students would have a greater chance of success and an ability to maintain and grow their grit. For those who did not have access to economic resources, such students would not have the ability to succeed with online schooling and likely would falter or fail. Therefore, this would reduce or eliminate their grit entirely. This social inequity could have completely derailed Caleb if he did not have access to the Internet or have a workable smartphone.

Finally, it is important to recognize that, although Caleb's mother was unable to support my interventions with Caleb, I can only surmise how difficult it may be to run a single-parent household. It is possible that one of the reasons why Caleb's mother was not able to help was because she was unable to do so. Depending on her job, she could be working during the time I tried to contact her. Additionally, because Caleb appeared to live in a household with low socioeconomic income, it could also be that Caleb's mother worked overtime or worked odd hours. In all, this is purely speculation. But, putting myself in her shoes, if I had to work significant amounts of hours to put food on the table, I would find it difficult to also intervene when I am at my limit of what I am doing each day.

Learning from Adhira

Analyzing Grit

From the outset, Adhira immediately was one of my grittiest students. She came into my class having such incredible qualities. But, many of these traits are common among students who take International Baccalaureate (IB) courses. For much of the time I taught Adhira, she sustained significant efforts to improve and had the capacity, passion and perseverance to

overcome any academic challenge. To me, Adhira was one of the most ideal students out there. She was always on top of things, she had self-control and restraint from misbehaviours, and developed many self-initiated strategies to help her improve and grow.

As previously shared with the story involving Caleb, student success does not entirely focus on grit's two domain-specific factors of consistency of interest or perseverance of effort. There are other factors at play. In Adhira's case, she sustained a high-degree of grit in physics, up until her familial situation negatively impacted her life. The familial situation would be an event that she could not control and, therefore, Adhira's grit changed due to such circumstances.

Analyzing Mindset and the Big Five Factors of Personality

Dweck et al. (1995) explain, "people's assumptions about the fixedness or malleability of human attributes predict the way they seek to know their social reality, as well as the way in which that reality is experienced and responded to" (p. 282). In my observations and experiences with Adhira, I believe that Adhira lived a growth mindset. Physics is sometimes academically challenging. However, Adhira never shied away from such challenges. Whenever she had difficulty with the materials, she always committed herself to finding ways to overcome such obstacles.

Adhira was often self-directed, motivated and independent. Because I put many resources on my web site for students to use (e.g., solution keys to practice problems, video podcasts of concepts and additional links to other online textbooks), Adhira always utilized these resources to improve. She also sought out help from other peers. Whatever the challenge, she found ways to overcome them. Adhira's attitude was very refreshing and way beyond her teenage years. For me, she took the bull by its horns, took responsibility for her success and ran with it. These are all hallmarks of what Dweck et al. (1995) say are growth-minded traits.

In examining the Big Five Factors of personality from Rimfeld et al. (2016), Adhira not only demonstrated clear signs of conscientiousness, but also had very high levels of extraversion and agreeableness. Caspi et al. (2006) describe those with a high degree of extraversion to be expressive, energetic and sociable. They say that those with agreeableness had traits of cooperation, empathy, consideration of others and a willingness to accept many others' points of view. Such individuals with both extraversion and agreeableness, in my opinion, are excellent team players.

One of the factors that led to Adhira's ever-growing success was her willingness to work with others. Regardless of the activity, situation or context, Adhira worked with students of many diverse backgrounds. I believe that meaningful growth from Adhira did not come from rote memorization, regurgitation of information or simply doing things for the sake of doing things. In my opinion, some of Adhira's academic success came from working with others. While Adhira continued to ask for extra help whenever she was not sure of something, the forming of a study group not only lead to increased collaboration but it allowed her and others to solidify information while questioning past omissions and mistakes. As a result of the study group's collaboration, every member experienced some form of improved success.

Adhira always demonstrated a high degree of grit and conscientiousness in physics. But, it is important to note that such trajectories changed as a result of familial difficulties. Through such familial issues, I started to see signs of anxiousness, stress and frustration. Adhira was not, by and large, a neurotic individual. The neuroticism she exhibited appeared to come because of external factors that Adhira could not control (e.g., her parents' illness and their subsequent inability to navigate a foreign system without English language comprehension). Therefore,

while Adhira did appear to demonstrate some neurotic traits through such familial circumstances, it did not define Adhira's true character.

Analyzing Intrinsic and Extrinsic Motivation

There are varying degrees of intrinsic and extrinsic motivation. For that reason, motivation should not be treated as a binary. Adhira was a blend of both. During my time teaching Adhira, I was always curious as to why she acted the way she did. What inspired Adhira to strive towards success without rewards? Even when I offered to contact her parents, she was happy with or without contact. To this day, it is still a puzzling conundrum and, therefore, I wished I had asked her why she acted the way she did. Unfortunately, now I can only speculate as to the reasons.

I identify as a South-East Asian Vietnamese teacher with Canadian roots. Adhira identified herself as a South-Asian Indian student. I truly believe one of the major reasons why Adhira connected so well with me was because our enduring beliefs were similar to each other's. Our cultures valued education above all else. But, most importantly, hard work, tenacity and perseverance were something that we ate and breathed. Failure was not an option within both our cultures due to our parents' own insistence on high achievement.

As a youth, my parents always encouraged me to work very hard to obtain a high standing in society. My parents would often remind me of the overt or direct racism that people of colour often faced. If we do not work hard or become successful, we would be considered second-class citizens. In speaking to other Asian peers, many people reflect the common shared cultural view of working very hard to obtain a high social standing in society. For that reason, I believe that her South-Asian culture also motivated her to become successful so that she could obtain social status. Perhaps, similar to my Vietnamese culture, failure was not an option.

Therefore, at a young age, she learned traits of hard work, perseverance and effortful persistence. Like me, such attributes were drilled into our heads at a young age.

Adhira exhibited a high-degree of mindfulness. When Adhira first arrived in the Canadian education system, she barely spoke English and had no idea how to navigate Canadian schools. She shared a story where she cried on the very first day of classes. Being mindful as to how such negative experiences impacted her life, Adhira was also motivated to not let others feel the way that she felt. Now, from a strengthened position, Adhira worked with many immigrant and international students. The reward for Adhira was the positive feelings she felt for helping others. She also felt the social connectedness with other students who shared similar values to her.

Analyzing Social Structures

Adhira was an incredibly adaptive individual in many social situations. Although Adhira arrived in Canada as a child, she was able to pick up on certain Canadian cultural norms, all the while remaining true to her Indian roots. Through her ability to adapt and blend in between the dominant Canadian culture and her Indian culture, she was able to easily make friends, work with others and navigate the Canadian education system. Adhira was a cultural straddler, which Carter (2008) describes as individuals who have the ability to identify themselves within the broader dominant society. Cultural straddlers can "successfully negotiate primary and dominant cultural codes in school in order to acquire academic success while also affirming and maintaining a strong pride in their [own] racial and ethnic heritages within the school context" (p. 469). Due to her adaptability, she was not only able to make meaningful connections with others but, as Hannover et al. (2013) say, she was able to overcome barriers that included

negative peer interactions, stereotypes in the school environment and a vulnerability to discrimination.

In reviewing Gore et al.'s (2016) work on culturally responsive pedagogy, students who feel connected to their school, connected to their peers and have strong relationships with staff and teachers tend to experience greater success. This is because such relationships fulfill the social needs of individual students. Because Adhira was known to be an incredibly hard working, dedicated, friendly and down to Earth altruistic individual, many students gravitated towards her. Through such traits, she also maintained a very positive reputation among the teaching staff, thus further reinforcing her overwhelming success.

Analyzing Income and Familial Structures

Throughout the time teaching Adhira, there was never a doubt that family income played a role in Adhira's grit and academic success. Every day, Adhira came to school with the appropriate resources needed for success. She had all her notebooks and materials, and had access to a laptop and a smartphone. However, with that said, familial structures had a considerable impact and effect as to how Adhira's grit suddenly changed in the middle of her Physics 12 semester.

Near the beginning of Physics 12, I asked Adhira if it was possible for me to contact her parents. That way, I could express my gratitude for her utmost dedication and leadership in class. Adhira had pointed out that her parents could not communicate in English and, therefore, would not be able to communicate back. It was clear that her parents entirely depended on her for English communication. This put a lot of responsibility and burden on her shoulders. As such, this responsibility is something that many students would not normally have placed on them.

When her parents got sick and had to go in and out of the hospital, Adhira was upset and appeared to be very overwhelmed when I pressed her about her drop in grades. She clearly expressed that she did not want to fail but, because of her parents' dependence on her for English communication and the fact that both her parents were significantly ill, she had to focus on them. Immediately, through this difficult turn of events, Adhira's familial role had to suddenly change from a dependent child to an independent adult. This difficult switch was not by choice, but by necessity. Without her intervention, it appeared that her parents would have no one. No child should ever be put in this sort of difficult circumstance.

In addition to this radical shift in roles, Adhira's parents may have faced a significant medical diagnosis. In normal circumstances, some parents of children may wish to shield their serious medical diagnoses from their children. However, in Adhira's case, due to her role as a translator, she would have to listen, process the information and face the full brunt of such medical diagnosis, all the while translating such heavy information to her parents. One can only imagine the difficult position in which Adhira was placed. The difficult, emotionally taxing and heavy burden placed on Adhira appeared to have such a negative impact on her.

It was not immediately obvious that this experience was transformative. But, years later, in my deep reflection of this experience, it provoked an epiphany. A major component of my epiphany is with Gorski's (2016) discussion of the deficit and structural ideologies in education. Gorski say that those who believe in a deficit ideology believe that "poverty is the natural result of ethical, intellectual, spiritual, and other shortcomings in people who are experiencing it" (p. 381). Therefore, in an educational context, educators who subscribe to deficit ideology believe people can change their success and situation through the recognition and change of "attitudes, behaviors, cultures, and mindsets" (p. 381).

Deficit ideology, in my opinion, completely disregards the significance of what Adhira went through with her parents. Up until her parents' illness, Adhira was one of the grittiest, most hard-working students in my class. She was very dedicated to her learning and took every strategy she could to maintain and increase her chances of success. Adhira was also a very loyal individual. She could not abandon her parents for the sake of her education. No matter how hard she tried to cope with her parents' situation, it continued to negatively impact her more and more.

This also speaks to Adhira's grit. If Adhira's parents did not experience illness that required Adhira's direct intervention, Adhira's grit may have been sustained within her academic setting. However, one may argue that Adhira's grit may have shifted to support her parents. While it appeared that her academic grit was declining, her ability to sustain significant focus and support her parents was commendable. As such, one may argue that Adhira's grit did not change. It just shifted from one setting to another. This event seems to support what Steinmayr et al.'s (2018) research say. Students can be gritty in many different domains.

Adhira's absenteeism was not related to her laziness or her lack of commitment. In trying to understand why Adhira did not express her family's issues with me in mid-April, I think about my experience with our discussion of Diwali. In that experience, Adhira appreciated my flexibility in wanting her to participate in Diwali cultural events. But, she noted that some teachers would not understand or were not as flexible. The Diwali story speaks about other privileged, dominant culture teachers who have the benefit of being able to celebrate Christian faith holidays without much consideration or thought. When one has such privilege, one does not have to think about it.

In Nova Scotian schools, some school holidays occur because of Christian faith holidays (e.g., Easter, Good Friday, and Christmas). Teachers who are of the Christian faith are readily able to participate without the worry about missing work. Adhira may have chosen not to ask for time off because other dominant culture teachers would not understand the significance of Diwali. This is possibly why Adhira was so shocked that I knew the significance of Diwali. Perhaps then, in my privilege of being born in Canada and my parents' privilege of being able to actively communicate in English, this brought out the same response in Adhira. It could very well be that Adhira did not mention the reason for her absenteeism because she thought I would not understand her situation.

While Duckworth et al. (2007) and Duckworth and Quinn (2009) recognize that structural barriers should be considered when examining grit, the numeric scores used in Grit-O and Grit-S excludes aspects of poverty, students' inequitable access to school resources, unjust school policies and, most evidently to Adhira, social, familial and cultural circumstances. The construct of grit requires the consideration of systemic and structural factors. When one over-emphasizes grit, one may dismiss the very relevant structural factors that impact students' daily lives. Such factors merit consideration.

Learning from Violet

Analyzing Grit, Mindset and the Big Five Factors of Personality

Violet's journey would be one of incredible transformation. When I think of Violet's transformation, I often think of a caterpillar changing into a butterfly. Throughout Violet's journey, every stage led to a metamorphosis, with a change in behaviour, a change in attitude, a change in learning styles and an ever-improving level of confidence. With each passing day, I observed Violet develop progressive levels of grit and academic success. When Violet first

arrived in Physics 11, she had many traits similar to students with a low degree of grit. She appeared to not have the skills to sustain effort, she demonstrated an inability to persevere when there were challenges and she had poor coping mechanisms. It was not evidently clear why Violet chose to take physics. Therefore, I was not sure if interest was something that factored into her decision. But, from the beginning, it was clear that her lower levels of grit would have a detrimental impact on her confidence and her likelihood of long-term success.

Violet had many good qualities about her. She was always engaged in class (e.g., writing down notes and coming to class on time), never a disruption and was never on her smartphone. But Violet was incredibly quiet, shy and socially isolated. She rarely ever asked questions and, as a result, kept academically stumbling. As much as I tried to encourage her and, provided her with opportunities to ask questions in private, she remained reserved. Looking back, I have had very successful students who are either extroverted or introverted. Just because a student is very quiet and shy does not necessarily mean they have a lower chance of success. However, at the beginning of the semester, Violet's lack of communication concerned me because it did not provide me with adequate feedback to know her daily progress. Only when an assessment was completed did I truly understood the full extent of her abilities.

While lower levels of extraversion gave me some cause for concern, it was not a major issue. Violet started to show many of the traits associated with neuroticism, addressed in Caspi et al. (2005). The first mid-unit quiz worried me. Although it was a passing grade, it was a lower than expected mark. In having a private conversation with Violet, she looked visibly upset with her performance. She admitted that she was incredibly anxious and was not as confident on her quiz. One of the solutions I offered was providing direct one-on-one extra help. That way, I can give her further word problems that would be similar to questions on future quizzes and tests.

Additionally, it would give me an opportunity to not only monitor her progress but also allow me to guide her development in physics.

Though some students who performed poorly sought extra help and support, Violet continued to avoid such opportunities for improvement. This attitude of avoidance led me to believe that Violet may have exhibited what Dweck et al. (1995) describe as a fixed mindset. These researchers describe individuals with a fixed mindset as tending to have less adaptability, poor coping mechanisms and a lack of grit. In reflecting on Violet's personality and behaviour, I believe it was not a conscious decision to avoid help and support, but it was her self-defeating belief in her abilities that really impacted her the most. It appeared that signs of neuroticism may have led her to an unconscious reinforcement of her fixed minded traits. As Dweck et al. suggest, "this tendency towards global self-judgments is usually accompanied by a greater vulnerability to other aspects of helpless reaction, such as negative [affect] disrupted performance, or the abandonment of constructive strategies" (p. 275). The abandonment of constructive strategies spiraled into what appeared to be a further lack of responsibility, for example, not printing off her class notes, and an inability to persevere.

It became clear that partnering with Violet's mom (Elizabeth) would have profound impacts on Violet's growth in the next stage of her metamorphosis. At the start of the semester, Violet demonstrated a low degree of conscientiousness. Poropat (2009) reminds us that students with few conscientious traits tend to have a higher likelihood of failure. Therefore, it was important to work on building more conscientiousness traits in Violet by first focusing on aspects of her neuroticism and extraversion. In the Nova Scotia context, educational inclusion is mandated. According to the *Inclusive Education Policy,* students have a right to an equitable and high quality education that is culturally and linguistically responsible, accepting and respectful in

supporting and valuing their learning and diverse abilities (N.S. Department of Education and Early Childhood Development, 2019). Combating what appeared to me to be Violet's higher levels of neuroticism, I made accommodations, such as adaptations on her first test.

In Nova Scotia, adaptations can be provided to address the diverse needs of students. Such adaptations can be seating arrangements, increased length of time for assessments and various other evaluation techniques. Additional time was one consideration that was implemented to help alleviate stress. Because Violet did not have to worry about a time crunch, she would be free to have one stressor removed. I also removed her from the testing environment because sometimes, the feeling of other students' stress added to Violet's stress. Violet clearly showed many signs of relief, but still had difficulties achieving her expected scores.

Although Violet had difficulties, there was a willingness to persevere despite her perceived failure. From my perspective, nothing was a failure, as I consistently saw progressive growth. It was important to continually remind and reinforce Violet's improvement. Violet often used self-defeating words such as, "I just suck," or "I should drop physics." But, through words of encouragement and having her reflect on her small but steady improvements, she continued to persevere, show signs of confidence and was ultimately able to progress further.

In helping Violet improve, a teacher-to-pupil mentorship experience opened a world of possibilities. Any constructive criticism I provided to Violet was never perceived as a critique of her abilities, but as a way to see further growth. I truly believe that having this closeness helped because she never saw my advice coming from a place of negativity, but always coming from a place of genuine care and compassion. Therefore, as a result of our positive mentorship experience, she used such strategies to grow and, over time, she eventually saw her grades improve.

As Violet continued to see improvements in grades, Violet started to act with a sense of purposeful commitment. There was also a clear sense of improving levels of confidence. Like Violet's unconscious decision to avoid extra help and support, I believe her ongoing success led her to eventually question her mindset—albeit unconsciously. McGonigal (2016) says a mindset is a "belief system that biases how you think, feel, and act" (p. 11). Perhaps through her considerable time and efforts spent on extra help and her ever-improving grades, Violet was able to develop what Dweck et al. (1995) note are growth-minded traits.

In the following year, Violet enrolled in Physics 12. At the beginning of the semester, Violet experienced some initial challenges. But, unlike in Physics 11, Violet was self-directed and, of her own accord, she sought help right away. It was humbling to see another metamorphosis take place. Regardless of the challenges, she was able to bounce back and continued to move forward without saying self-defeating words. Within a year, Violet transformed from being a student who appeared to have a low degree of conscientiousness, to a much higher one. Caspi et al. (2005) describe conscientious individuals having "the capacities to sustain attention, to strive towards high standards, and to inhibit impulsive behaviors" (p. 473). At this point, Violet was unwilling to go back to her old ways and always strived to do her very best.

As time went on, it was clear that Violet became much happier. Regardless of the difficulties she faced, she remained positive and was still very eager to learn. In comparison to her Physics 11 experience, it was like night and day. Duckworth et al. (2007) and Duckworth and Quinn (2009) showed that those with stronger positive personality profiles tended to have a higher level of grit. This is because individuals who have a strong personality profile tended to build on their existing base of positivity and optimism and, for that reason, they "are better able

to persevere in their goal pursuit" (Hill et al., 2016, p. 259). Therefore, it can be said that those with a positive attitude will likely have the ability and eagerness to learn and be able to persist through obstacles and challenges (Poropat, 2009; De Raad & Schouwenburg, 1996), all of which Violet clearly demonstrated.

As Physics 12 progressed, I had fewer opportunities to spend time with Violet and needed to pair Violet with Faisal. Although Violet maintained some reservations in working with others, she was able to collaborate very well with Faisal and was eventually able to blossom in this tutoring experience. Weekly, Violet continued to see exceptional grade improvements. By the end of the semester, she eventually became one of the highest achieving Physics 12 students in my class. In Violet's final metamorphosis, she no longer depended on either Faisal or me. Through her own independence, resourcefulness and study habits, she continued to excel, regardless of any obstacles preventing her success. In the end, Violet appeared to demonstrate grittier traits than when she was enrolled in Physics 11. Violet not only continued "working strenuously towards challenges, [but continued to maintain] effort and interest over years despite failure, adversity, and plateaus in progress" (Duckworth et al., 2007, p. 1088). Violet was unlike many students that came into my class. No student in my experience suffered repeated defeat over and over again. Yet, Violet demonstrated the embodiment of what it means to be a gritty student, one who continued to face challenges head-on and was able to treat her journey as a marathon of progression and growth.

Analyzing Intrinsic and Extrinsic Motivation

At the beginning of the semester in Physics 11, Violet did not seem motivated to succeed. Although she took class notes, refrained from misbehaviours and maintained focus in the class environment, Violet avoided many opportunities for improvement. Violet did not seem

motivated to reach out and I believe it was mainly due to her negative experiences in Grade 10 math. As Ryan and Deci (2000) describe, there are a range of factors that impact the motivations of individuals including resistance, perceived control, disinterest, attitude, resentment and a lack of acceptance of the value of a task. Violet admitted that, in the previous year, mathematics was very difficult for her. She spent a considerable amount of time attending extra help, both in school and with her tutor. Even with all these interventions in place, Violet continued to struggle and do poorly, and likely resented such experiences.

From my experience teaching physics, some of my students appeared to be motivated to seek out challenges when they have a foundation of previous academic success. But, throughout Violet's time in high school mathematics-related subjects, Violet constantly struggled and, therefore, her foundation for mathematical success was weak. It is possible that, for students who have poor academic success, taking on very difficult challenges may be a major psychological barrier. They may ask themselves why they would take on major challenges when other similar challenges were unachievable?

It was then important to motivate Violet by allowing her to take on small, but achievable goals. That way, she could observe continuous success and be motivated to persist in even greater and more demanding challenges. While extrinsic motivators, such as the sticker bombs helped, it was not a significant motivational tool, since she kept on falling below the required scores needed to earn a sticker bomb. However, beside the point of the sticker bomb, positive encouragement, feedback and the mentorship role I had with Violet significantly altered her trajectory. Therefore, and as it is for most learners, positive and meaningful reinforcement was needed to motivate her to keep trying. Meaningful and positive reinforcement would not only come from me, but also from her mother. As noted previously, partnering with Violet's mom

(Elizabeth) had profound impacts. Although I did not know what went on between both mother and child, I can assume that any dedicated parent like Elizabeth would encourage their child to continually try.

Violet appeared to suffer from low-conscientious traits due to repeated failures in mathematics-related classes. Constant failure appeared to be a detrimental theme in her life and, as a result of such repeated failures, she appeared to exhibit many traits related to neuroticism, such as a major vulnerability to stress, poor coping mechanisms, anxiousness, a lack of confidence and frustration in her abilities. As she continued to fail, I believe her self-worth continued to suffer. While some students are motivated with extrinsic rewards (e.g., treats), I felt it was more important to motivate her by building on her feelings of self-worth. Although the feelings of self-worth have connections to internal regulation, Ryan and Deci (2000) say that such feelings are connected as a result of external controls and, therefore are extrinsic motivators.

As Violet saw small, but meaningful success, I kept on encouraging her to see the big picture. It was clear that, through positive reinforcement, Violet wanted to excel. The feelings of success were likely addictive for Violet because she started to initiate more proactive strategies for increasing her success. To that end, I started to see more signs of intrinsic motivation. Ryan and Deci (2000) describe individuals with a high degree of intrinsic motivation to have satisfaction due to competence and autonomy. It was evident that, while the curriculum in physics progressively got harder, she continued to remain persistent by taking on more challenges, while actively finding proactive ways to succeed.

Analyzing Social, Income and Familial Structures

In physics classes, Violet appeared to be socially isolated. While social isolation did have an impact on Violet's ability to rely on others for help, it was not a major contributor to her levels of success in Physics 12. Even at the highest point of her academic success, Violet did not socialize with many other individuals. She maintained a small social circle with Faisal, the teachers who were close to her and her mother. Outside of school, she participated in Ultimate Frisbee and had a part-time job. Both activities, while important, did not seem to be contributory factors towards her long-lasting growth and academic success in physics.

While I did not know Violet's family dynamics, I did know Violet came to school every day with the proper materials and resources available for success. There was never any indication that poverty or racial issues ever played a role. I believe it is worth noting that poverty can be tricky because there is such shame and stigma imposed on people living with limited income or in poverty. For some students, they may try to camouflage it from their teachers and peers. However, as a holistic practitioner, I make every attempt to be cognizant of each student that enters in my class. That way I can support each student based on their own needs and circumstances.

Elizabeth was an incredibly dedicated and supportive parent. While Violet had difficulties, Elizabeth remained steadfast and was available to help whenever needed. However, parental expectations likely played a major role on Violet's sense of self-worth. After Violet's first unit test in Physics 11, Violet performed poorer than Elizabeth's expected score. Not only did Elizabeth blame me for Violet's poor performance, she also added that she was disappointed in Violet. This negative perception and added pressure may have negatively impacted Violet's sense of self-worth because it further added to the possible neuroticism that Violet experienced.

As such, it was important to continue to remain focused on uplifting Violet, while not letting my negative experience with Elizabeth impact Violet's learning and progression.

After a few weeks had passed, Violet completed her second mid-unit quiz. Unfortunately, in Violet's perspective, she felt like she earned a lower than expected score. Violet truly felt like she studied hard. She put in significant amounts of time studying, sought help and constantly asked for feedback. Still, even with all these actions, Violet's lower than expected score only justified Violet's sense of failure. It was then important to try to change Elizabeth's measure of success. Through my contact with Elizabeth, I believe I may have provoked an epiphany in Elizabeth. While she may have continued to believe that earning grades above an 80% was considered a success, she did acknowledge small, but measured success was better than expecting gigantic leaps. It was through this action that my relationship with Elizabeth became much more positive. Subsequently, it was evident that Violet benefited from a less negative perception and less parental pressures. Therefore, Violet continued to improve.

Conclusion

Implications of Grit, Mindset and the Big Five Factors of Personality

In reviewing the stories of Caleb, Adhira and Violet, each student achieved different degrees of success. While success is not an arbitrary bar that each person reaches, it is a fluid and ever-changing goal. For Caleb, success in Grade 11 and Grade 12 meant passing the course. But, by the end of grade 12, Caleb far exceeded his original passing score. Adhira wanted to excel in her understanding of physics. Despite the familial issues that occurred, she managed to overcome her obstacles and succeeded. Violet started off physics with significant challenges, due to her negative experiences in mathematics. While a pass was an early goal, she eventually ended up far exceeding every expectation and became one of the top students in Physics 12.

Examining the stories involving Caleb, Adhira and Violet has been a humbling one. Each student started off with varying degrees of grit. Galton (1892) believed the highest performers had a capacity to sustain significant effort towards achievement and had the passion to do so. Those with higher-levels of grit tended to have qualities that included ferocious determination, conscientiousness, resiliency, self-control, sustained effort and a strong ability to persevere when challenges arise (Duckworth et al., 2007; Duckworth & Quinn, 2009; Hill et al., 2016; Hochanadel & Finamore, 2015; Muenks et al., 2017; Noftle & Robins, 2007; Rimfeld et al., 2016;). While Caleb and Violet initially appeared to start off with very few, if any, of these qualities, in time, both of them eventually had many of these traits.

Duckworth et al.'s (2007) Grit-O test, and Duckworth and Quinn's (2009) Grit-S test use a survey comprised of two domain-specific constructs: perseverance of effort and consistency of interest. According to Duckworth et al. and Duckworth and Quinn, those with a high degree of perseverance of effort always demonstrate a consistent determination towards a higher order goal. Those with a high consistency of interest enjoy engaging in the same activities over and over throughout time. Such individuals do not abandon a goal because of novelty.

Throughout the journey teaching Caleb, Adhira and Violet, grit appeared to change daily, depending on the ongoing circumstances that each student faced. While understanding the overall aspect of grit and its relationship to student success was very important to me, the two domain-specific constructs became less and less important once the structural factors that impacted grit became apparent. I believe there is another important point to consider. There was already also so much variability related to Caleb's, Adhira's and Violet's overall grit that further examining such domain-specific constructs would be of little benefit. This seems to align well

with Duckworth et al. and Duckworth and Quinn's research because these researchers were reluctant to separate their survey items into these two domain-specific categories.

Caleb, Adhira and Violet's mindset was one significant factor that impacted their individual traits of grit. McGonigal (2016) describes a mindset as "a belief system that biases how you think, feel, and act ... it's like a filter that you can see everything through" (p. 11). Dweck et al. (1995) believe, "people's assumptions about the fixedness or malleability of human attributes predict the way they seek to know their social reality, as well as the way in which that reality is experienced and responded to" (p. 282). When Caleb and Violet both started off in Physics 11, they both appeared to demonstrate many fixed-minded traits. Both Caleb and Violet appeared to have poor coping mechanisms, frequently blamed themselves or others and did not appear very resilient or adaptable. Adhira, on the other hand, appeared to possess many growth-minded traits. Such traits included taking responsibility for successes and failures, willingness to accept challenges and the ability to turn areas of weaknesses into areas for growth.

Whether a student conscientiously or unconsciously subscribes to fixed-minded or growth-minded traits, personality factors also play an important role on influencing grit. Grit is found to be closely affiliated with conscientiousness, more so than the other Big Five factors (Duckworth et al., 2007; Dumfart & Neubauer, 2016; Hill et al., 2014; Poropat, 2009; Rimfeld et al., 2016; West et al., 2015). In Dumfart and Neubauer's (2016) research, the trait of conscientiousness was the best predictor for achievement. Adhira, from the outset, appeared to possess the qualities of being persistent, determined, responsible, independent and attentiveness. All of these are highly associated with a high degree of conscientiousness (Caspi et al., 2005; Poropat, 2009). Adhira maintained relative success throughout Physics 11 and Physics 12, albeit her familial difficulties impacted her conscientiousness.

In the beginning of Physics 11, Caleb and Violet appeared to have few, if any, conscientiousness traits. Both seemed to struggle and have difficulties succeeding in the class. While many researchers suggest that grit is directly related to conscientiousness, more so than the other Big Five factors (Duckworth et al., 2007; Duckworth & Quinn, 2009; Ivcevic & Brackett, 2014; Rimfeld et al., 2016; Steinmayr et al., 2018), I also agree with Noftle and Robins (2007) and Poropat (2009) that factors such as agreeableness and low neuroticism are also factors contributing to grit and academic achievement.

Positive behaviours contributed to grade predictions (Willingham et al., 2002). This is because those with a higher level of grit tended to have a more positive personality profile (e.g., stronger emotional stability, extraversion, openness to experiences, agreeableness and conscientiousness) and lower levels of neuroticism (Duckworth et al., 2007; Duckworth & Quinn, 2009). In reviewing Caleb and Violet, both students appeared to have significant vulnerabilities to anxiousness, stress and demonstrated very poor coping mechanisms. Through many interventions and supports, both Caleb and Violet eventually developed better coping skills, reduced their neuroticism and began to develop other conscientiousness traits. While extraversion also had some relevance in the success of Caleb, Adhira and Violet, Violet appeared to be very introverted and yet ended up being very successful. Schools have tended to cater more to extroverts and new research is rethinking introversion is perhaps a more desirable quality. Therefore, with that point said, although the Big Five factor of conscientiousness played a significant role in each student's grit and academic success, low neuroticism also played an incredible role in reinforcing better conscientious traits.

Based on my time teaching Caleb, Adhira and Violet, their experience seems to suggest to me a change is needed in how education is delivered in the Nova Scotia context. While I

understand that the Nova Scotian government has finite financial resources to spend on education, I have to consider the number of students who do not graduate high school or post-secondary education. I also have to consider the level of disengagement that occurs in our classrooms because the education system does not do a good enough job in addressing the disconnect between students and schools, improving students' sense-of-self and developing their personality profiles.

It became apparent that, once my students trusted me, a mentor-mentee relationship could be established. This trust was sometimes difficult to obtain because it required a genuine and nurturing relationship to occur. This relationship required time and effort, with time being an absolute luxury considering the large class sizes, administrative burdens and increasing levels of need in the classroom. Sadly, sometimes I had to pick and choose who I could help. Once the relationship began, I started to notice students changing their personality, mindsets and academic behaviours. For some, students progressively improved and started to show signs of academic success. While some did not experience immediate success, the lengthy and valued relationships allowed me to foster long term gains, much like I had experienced with Caleb.

Implications of Intrinsic and Extrinsic Motivation

Motivation is related to grit because individuals may be motivated to do something purely out of internal interest or inherent satisfaction (Ryan & Deci, 2000; Von Culin et al., 2014). Ryan and Deci show many factors that impact on the motivations of individuals, including resistance, perceived control, disinterest, attitude, resentment and a lack of acceptance of the value of a task. As Ryan and Deci describe, there are varying degrees of motivation, which are influenced by a perceived locus of control. At one end of the spectrum is intrinsic motivation. Ryan and Deci say those who are intrinsically motivated do it "for its inherent satisfaction rather

than for some separable consequence" (p. 56). However, at the other end of the spectrum is extrinsic motivation. Ryan and Deci describe those who are extrinsically motivated to be moved by some external factors such as rewards, punishments, ego-involvement and a desire to maintain feelings of self-worth, to name a few. Because motivation exist on a continuum, both intrinsic and extrinsic motivations should not be treated as a binary.

At the beginning of Physics 11, both Caleb and Violet seemed to demonstrate a low degree of grit, poor academic performance and a fixed mindset. These attitudes appeared to have had a detrimental impact on long term academic success. To combat such poor mindsets, examining what made Caleb and Violet motivated was important because the degree of motivation is deeply connected to such mindsets (Poropat, 2009; Von Culin et al., 2014). For Caleb, his journey in physics was difficult. Caleb was often motivated through many extrinsic rewards, including treats, sticker bombs, positive reinforcement, encouragement and monetary rewards from his grandmother. While such motivators helped encourage and stimulate growth in Caleb, it was often very short-lived and not long lasting. Both Adhira and Violet were not extrinsically motivated through treats, sticker bombs or monetary rewards. As an example, when I wanted to contact Adhira's parents about her leadership and success in my class, Adhira did not care one way or the other.

Both Caleb and Violet appeared to suffer from a high degree of neuroticism. I believe that their neuroticism strongly impacted their sense of self-worth. This level of vulnerability resulted in many negative attributes, from Caleb escaping the classroom in Grade 11 and to Violet saying many self-defeating words. Frequent positive and meaningful reinforcement was needed to encourage and motivate them. There is nothing more powerful than positive statements from a respected role model. Through such words, the intention was to build on Caleb's and

Violet's sense of self-worth. Through this action, I noticed their traits resembling neuroticism slowly disappearing. Eventually, as evidenced by their slow, but progressive growth, they were motivated to take on small but challenging goals.

In reviewing Ryan and Deci (2000), although feelings of self-worth have connections to internal regulation, such feelings are connected to extrinsic motivation because of an external locus of control. Cultural influences are another external locus of control that needs to be recognized. Although Adhira was happy to receive positive reinforcement, I believe the driving force that motivated her to succeed was her Indian culture. In her culture, failure was not an option and, therefore, there was always this hidden pressure impacting Adhira. The traits of hard work, tenacity and perseverance were something that she ate and breathed, and success for her appeared to be hinged on this constant pursuit for satisfying her Indian roots. Tying Adhira's Indian culture to the Big Five factors, it appears that, as we understand more about human differences, diversity and equity, we may see that some cultures may value certain personality traits, including motivation, more than others.

As it is for most learners, success was addictive for Caleb, Adhira and Violet. As Caleb, Adhira and Violet saw higher levels of academic success, they all acted with a sense of independence and autonomy. This reinforced their internal locus of control and, therefore, promoted a high degree of intrinsic motivation (Ryan & Deci, 2000). Caleb started to develop many intrinsically motivated traits when we went on an online-learning approach, due to the COVID-19 pandemic. Caleb controlled his environment. He did not have to worry about other people watching him; he controlled his pace and progress and did not need to be micromanaged. Through such independent actions, he saw significant academic success.

Like Caleb, Violet started to see even more progressive growth and success as she took on more independent actions, initiatives and proactive strategies. Through such effort, she not only improved in areas of deficiencies but also became one of the highest achieving students in Physics 12. Adhira's motivation to help others was based on her own past negative experiences. Because she did not want other immigrant and international students to feel the way she felt when coming to Canada, she took her own initiatives to help others succeed. While teamwork and collaboration also contributed to her own success, it also helped build her sense of self-worth.

The greatest strides in Caleb, Adhira and Violet's success came because of independent actions and complete autonomy. For Caleb and Violet, extrinsic motivators were less and less important, and intrinsic motivators ultimately took over as their driving force for major and transformative change. While challenging familial issues occurred for Adhira, she maintained consistent success because of her own intrinsically motivated choices. Such choices included her willingness to seek out challenges and a willingness to extend her abilities. This, I believe, is major. The fact that she was trying to manage both her academics and her parents' health circumstances truly demonstrated a high-degree of grit in both her academic and personal realms.

As a result of Caleb's, Adhira's and Violet's intrinsically motivated traits, they demonstrated a high degree of grit as suggested by Von Culin et al. (2014). It is important to note that, without the extrinsic motivators to initially stimulate and drive Caleb's and Violet's success, they would not be as successful as they would be today.

Implications of Social Structures

McIntosh (2005) discusses the concept of an invisible knapsack, where some students come into school having a certain set of privileges when compared to others. As a result, issues

around social, income and familial structures are the ongoing factors that impacted grit and student success for Caleb, Adhira and Violet. In a world of different educational ideologies, Gorski (2016) suggests deficit and structural ideologies being two ends of a wide spectrum. Gorski says, for those who believe in deficit ideology, people can change their success and situation through the recognition and change of "attitudes, behaviors, cultures and mindsets" (p. 381). Whereas, for those who believe in structural ideology, Gorski says, disparity in education is due to the structural barriers and inequitable distribution of access and opportunities.

I often meditate and reflect on my role as an educator and my own struggles related to grit. In the past, I was involved in many student interventions to address student failure. Many school-led strategies in overcoming failure have been to address certain learning deficits. This is the deficit ideology that Gorski (2016) discusses. As an example, in my early career, I taught a course called Learning Strategies 10. Being new to the teaching profession, I sought out an experienced teacher who previously taught the course. I recall the teacher mentioning that the course was like the resource support that was offered to students, except it had assignment modules that students had to complete to help address their learning deficits. I sought out the official curriculum outcomes, prior to teaching the course. While the course had specific curriculum outcomes that addressed strategies for improving learning behaviours, it was mostly related to changing overall attitudes. Such changes included building on self-advocacy skills and social understanding, addressing deficits in critical thinking related to literacy and mathematics, and improved upon skills such as communication and comprehension.

While such learning strategies did help some, in reflection, I do not recall it significantly improving my students' academic skills. In fact, many of my students in the class continued to fail their other classes and, regardless of my efforts related to changing these academic attitudes,

nothing seemed to help. I now believe it was because no one truly considered the negative implications of the structural deficits such as poverty, familial structures, race, ethnicity, culture and social status had on students. By only adhering to the ideology around changing personality, work habits and effort, we consciously or unconsciously ignore the structural deficits.

Prior to my research journey, I also fell into the deficit ideology trap. It seems that most, if not all, interventions done in school to date have been to address the learning deficits that students' experience. However, it appears that some educators are cognisant in considering the structural factors that have impacted student achievement and, therefore, for some interventions I have witnessed, such structural factors are now considered.

In examining my own personal role, related to grit, I often reflect on how I, over time, became gritty. While my family was not privileged and had to earn everything to be successful, my parents did come to Canada with certain skills that not many refugees possess. Both of my parents were educated. There was always a positive and nurturing parental influence that supported my upbringing and, while poverty was relevant in my life, the nurturing parental role ultimately impacted my own grit. It is monumentally important to not dismiss the significant structural factors that have a major role to play in every student's life. I do not believe in throwing the baby out with the bathwater. However, as it stands, the Grit-O and Grit-S tests do not address these structural factors. Therefore, I believe the grit tests should be revised considering these aspects being brought to light.

Grit is circumstantial. If one lives in a world where all students not only have their socioeconomic and sociocultural needs met, but are also living on a level playing field, grit has a major role to play. However, we do not live in this type of world. Our world is complex. Therefore, students grappling with different life circumstances will require a teacher's awareness

and consideration of such systemic and structural barriers. Once this is acknowledged, grit may be used to help educators facilitate and improve on their pupils' weaker traits, as reflected from their pupils' Grit-O and Grit-S scores.

In examining the stories of Caleb, Adhira and Violet, social structures played differing roles, depending on the individual. Although Violet was socially isolated and did not have other peers to rely on for help, it did not appear to be a major contributor to her success. Even at her highest point of academic success, Violet did not socialize with many individuals. However, for Caleb and Adhira, their context was significantly different.

One of the significant factors that negatively impacted Caleb's grit and academic success was his inability to form meaningful and strong relationships with other students in his physics class. As Hannover et al. (2013) describe, one of the barriers to academic success is negative peer interactions. While many social bonds already existed among students, due to their social and extra-curricular activities, Caleb did not appear to have connections to many of these students. It was terrific to see some students readily accepting Caleb into their social circle. However, after the bullying incident with Alice, many students avoided him. In contrasting Caleb's story with Adhira, she was an incredibly sociable and friendly person, and part of her overall growth came because of the social connections that occurred in her study group. Gore et al. (2016) say students who feel connected to their school, connected to their peers, and have strong relationships with students and staff tend to experience greater success because such relationships fulfill the social needs of individual students.

Being a cultural straddler was another factor that likely impacted Adhira's grit and success in physics. Carter (2008) describes a cultural straddler as an individual who can "successfully negotiate primary and dominant cultural codes in school to acquire academic

success while also affirming and maintaining a strong pride in their [own] racial and ethnic heritages within the school context" (p. 469). Because of Adhira's ability to adapt and blend in between her Indian culture and the culture of the dominant society, not only was she able to make meaningful friendships and feel included in school, but she was able to eliminate many structural barriers related to negative peer interactions, stereotypes in the school environment and a vulnerability to discrimination—all traits as described by Hannover et al. (2013).

While Carter (2008) uses cultural straddlers in terms of racial and ethnic heritages, I believe it can also be applied to Caleb. In examining the definition of culture, Hamilton et al. (2008) describe culture as a "shared pattern of thoughts, symbols, and actions typical of a particular group" (p. 22). One of the major difficulties that Caleb faced was his inability to adapt and blend in between the culture of his social group and the culture of the physics classroom. Caleb always wanted to maintain the appearance of acting tough and avoided looking vulnerable, even at the expense of success. Perhaps, within his social group, being perceived as smart completely contradicted the trait or symbol of being cool. Perhaps, by doing well in school, it would have diminished his standing within his social group. It is important to recognize that, while the COVID-19 pandemic resulted in Caleb being forced to do school online, it completely removed the issue of being a cultural straddler. Once Caleb continued to do school online, major strides in grit and academic success occurred because Caleb was able to eliminate the social pressures and hide his success within his social group.

Implications of Income and Familial Structures

There are many complexities and hidden dynamics that are related to income and familial issues. As a result, I can only infer based on what I have observed and what was shared with me. Family income also had significant impacts on individual student's grit and success. Caleb lived

in a lone, single-parent household. He appeared to have significant economic disadvantages, as demonstrated by how he came to school every day with limited learning resources. While many students sported the latest technological gadgets, Caleb utilized a broken, but usable, older generation iPhone. He lacked access to a laptop, which was problematic when it came to enhancing at-home learning. When the COVID-19 pandemic arrived, it exposed significant economic disparity for students. Those who had many economic resources maintained or continued to excel in their schooling. However, students who had little to no resources suffered as a result. For Caleb, if he did not have the Internet or the use of his iPhone, he would have failed, as a result. This stands in contrast to students like Adhira and Violet, who both came to school every day with the appropriate resources needed for success. Therefore, for those who have privilege, or a full knapsack, such students have the greatest likelihood of having a high degree of grit. However, for those who came to school with limited resources, the opposite may be true.

Family dynamics played a critical role in grit and student success. In examining Violet's story, parental expectations played a key role in Violet's sense of self-worth, possibly impacting Violet's high-levels of apparent neuroticism. Violet derived part of her self-worth from what other important people in her life thought of her. While Violet's mother (Elizabeth) wanted Violet to excel, constant pressures, high expectations and perceived parental disappointment seemed to weigh heavily on Violet. Although it was not one thing that led to Violet's overwhelming success, I believe part of it had to do with Elizabeth's change on what it means to be successful. When Elizabeth changed that mindset, perhaps parental pressure and demands waned. As a result, Violet demonstrated fewer neurotic traits, perhaps because she did not have to worry about what her mother thought of her.

For the longest time throughout Physics 11 and Physics 12, Adhira maintained a high degree of academic success. Adhira's success was attributed to many traits synonymous with grit. The moment her parents became ill and needed Adhira as a translator, everything abruptly changed. Adhira's greatest barrier to her grit and academic success was the difficulty balancing both scholarly commitments and her obligations to her sick parents. In many instances, she had to assume a very adult role in her family while, at the same time, trying to complete her academic studies. She appeared overwhelmed by the responsibilities and worries placed upon her. As a result of such obligations, she either missed class, or came late. Adhira's story demonstrates that non-controllable factors, such as family dynamics and parental obligations can have negative impacts on students' academics, grit and chances of high level success. In my opinion, if Adhira's parents did not depend on Adhira, I strongly believe she would have maintained her upward trajectory of growth.

Finally, through stories like Adhira and Violet, familial dynamics played a contributory role into their grit and success. From my observations I believed Caleb lived in a family where economic barriers existed. It is possible that Caleb's mother did not support me because she was unable to do so, as she potentially struggled to maintain the household. Trying to balance employment with running the household can be a difficult and overwhelming thing. While Violet's and Caleb's parent offered different levels of support, the parental guidance and involvement is significant in steering students onto the right pathway for success. Luckily, when Caleb's grandmother intervened, it only stimulated further grit and academic success for Caleb.

Tying Things Up

All too long have I struggled with the widening achievement gap related to student success within my physics classroom. I have always tried to find ways to progressively change

my teaching practice through reviewing current educational research. However, few items ever piqued my interest until the research on grit came along. Prior to doing the research around grit and student success, I believe that by utilizing Duckworth et al.'s (2007) Grit-O test and Duckworth and Quinn's (2009) Grit-S test, it offered an easy way to identify students with a low degree of grit. From there, I would be able to provide interventions that helped eliminate student failure, while changing individual students' attitudes and academic behaviour.

However, it is short-sighted to purely rely on the grit ideology as a way of fostering academic success. As described by Gorski (2016), grit ideology is dominated by deficit ideology. This ideology implies students can change their academic trajectory by changing attitudes, behaviours, cultures and mindsets. This entirely dismisses the structural inequities that many students' faces. Prior to conducting the research around grit, deficit ideology was the bias I had subscribed to. I believed that changing a student's attitudes, behaviours and mindsets was the key to countering the narratives of repeated failure and defeat in students with low degrees of grit. Clearly, this was not the case when exploring the stories involving Caleb, Adhira and Violet. There were numerous additional factors such as poverty, family instability, culture and parental involvement that also deeply influenced their individual trajectories towards success. To completely dismiss these structural factors by only recognizing changing mindsets and attitudes absolutely disregards the unique situations and circumstances that dictate the lives of everyday students. I believe my research is significant because while it appears that the education system, I work in have utilized deficit ideology to address the achievement gap, it appears that success is mixed at best. My research provides a valuable and unique insight into the understanding of the structural factors and how the lives of students who varied in their grit ultimately succeeded through such addressing, understanding and recognizing such structures.

Recommendations, Limitations and Delimitations

In my autoethnographic study there were limitations and delimitations. Two limitations arose. The first limitation is related to how different individuals interpret my stories and findings. The socially constructed nature of reality may result in different individuals interpreting different experiences because the interpretation of a situation depends on differing views, interests and values one subscribes to (Muganga, 2015; Savin-Baden & Major, 2013). The second limitation comes from sharing my epiphanic narratives and stories. It is recommended that future research may wish to explore interpretations and stories directly from individual students. Through my autoethnography, it would be very difficult to confirm my interpretations with students who have since graduated and/or have long become disconnected. Understanding the interpretations directly from students can greatly add to our understanding of the factors that led students to develop their grit and their path towards success.

My study had delimitations due to the experiences I gathered from three individuals. Caleb, Adhira and Violet were chosen because they had provoked a significant epiphany. As such, the experiences and perspectives yielded from my study may not produce generalizations. While Duckworth et al. (2007) and Duckworth and Quinn (2009) have been able to utilize Grit-O and Grit-S to predict the chances of success in many different contexts, the very dynamic, complex and intricate stories involving Caleb, Adhira and Violet demonstrates the many different factors that significantly impacted students' grit and academic success.

While understanding the overall aspect of grit and its relationship to student achievement was very important to me, the two domain-specific constructs became less and less important once the structural factors that impacted grit became apparent. This led me to focus more on the structural barriers that impacted a student's overall grit, rather than dive deeper into the domain-

specific components. Therefore, for some, investigating the domain-specific nature of grit and its relationship to structural deficits may be worthy of investigation.

It was important to provide a thick description (Geertz, 1973) of both the story and the analysis because, as Riemer (2012) suggests, providing thick description goes beyond merely describing an event; it is a cultural interpretation. While my cultural interpretation focused on mindsets, the Big Five factors of personality, structural and deficit ideologies, social, income and familial issues, there may be other possible factors, such as a student's mental health, school climate and peer culture.

Each student in my autoethnography brought unique experiences and stories. However, I did not include African Nova Scotian and Indigenous students into my study. At the time of writing my stories, it was rare that I had African Nova Scotian or Indigenous students taking my physics classes. When I did have students from either demographic attending my classes, my experiences at the time of writing did not provoke significant epiphanies. Having other underrepresented students would have enhanced the study by providing a deeper understanding around cultural and racial identities, in addition to understanding how prejudice, discrimination and intergenerational trauma may have impacted students' grit and student success. Future researchers will also need to be mindful of the delicate balance between subscribing to pure deficit or pure structural ideologies. These two ideologies should be treated as a spectrum rather than a binary.

Closing Statements

In wrapping up my journey related to my autoethnography on grit and student success in a high school physics classroom, I have been truly humbled by the experiences I obtained from being a researcher. Many times, along this journey, it was difficult to wear the researcher's hat.

At times, I found myself embarrassed by expressing my own vulnerability related to certain choices I made. Looking back, it was easier to forget a bad decision or the poor choice of words I had with a student. However, this vulnerability provided me with an opportunity to reflect on how I could change myself and my teaching practice.

Throughout this journey, I found myself changing my practice when I discovered something meaningful. I can say that I have found myself to be a much more reflective practitioner and educator. I am no longer biased towards the deficit ideology. I am very cognisant of the impacts related to the systemic barriers and challenges that many of my students experience. This mindful understanding has led me to adapt and change how I go about closing the achievement gaps with at-risk students. While I remain empathetic with each of my students, understanding the structural deficits has allowed me to become a better advocate and supporter.

There were moments where negative thoughts filled my head. Research was such a difficult, time consuming and emotionally taxing journey that I admittedly felt like giving up. There were times where I had to slow my pace of my research due to the difficult choices I had to make. Due to the circumstances, such as large class sizes, the number of classes I must teach and increasing levels of need in my classroom, I often found myself choosing between my own research or diverting such time and energies towards my students. It was an easy choice to choose my students because the time I spent investing into my students was never wasted. Many of my students continue to experience further success. To see their feelings of self-worth change is something so powerful to me. It provided me with the motivation to continue to work hard and help my students succeed.

Often, I would read *Chapter 4: Grit and Student Success in a High School Physics Classroom*, because I often reflected on my students' own journey and obstacles. I often got back

up because I was so inspired by how my students overcame their barriers. If they could overcome an obstacle, I should as well. The experiences I had with my students humbled me. Throughout this journey, my students have taught me more about success than I taught them. I have become a student of my students. The most powerful underlying aspect of my teaching is the deep reflective practice that I have always taken and such reflective practices have been more helpful than trying to find one avenue or strand of research that helps close the achievement gaps in my class. I still believe in grit. While grit, as it stands, does not directly address the structural barriers that each student faces, it is important, as an educator, to not throw the baby with the bathwater. Perhaps, my autoethnography will provide others with an opportunity for a deep examination of their own practice related to grit and student success.

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