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Nurturing Excellence: A Case Study of High School Learning Environments for the Gifted

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Framed in the tenets of Self-Determination Theory, this study investigated how three secondary schools nurtured student agency, curiosity, and confidence. The descriptive case study included twelve participants who served as teachers, administrators, and counselors. Analysis of the data yielded five themes consistent to all three school sites: Connected Technology, Structured Questioning, Interdisciplinarity, Appreciation of Intensities, and Gradual Release. Each theme was described through the lenses of student agency, curiosity, and confidence to provide context and details pertaining to how modern learning environments can be built as courses, programs, and school to maximize the potential of gifted secondary students.

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Keywords: gifted education, secondary, high school, agency, curiosity, confidence

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CHAPTER ONE: INTRODUCTION

Thousands of five to eighteen-year-old students spend seven to eight hours a day, five days a week, nine months of the year with adults other than their parents, grouped by age into spaces that normally accommodate 20-30 students (Meier & Gasoi, 2017). Elementary students are taught multiple subjects (Reading, Writing, Mathematics, History, etc.) by one teacher in one classroom per year. Middle and high school students continue their journeys deeper into these subjects, but they are guided by increasing expertise – traveling to different classrooms and to different teachers throughout their days. Course selection differentiates as students get older, as students are afforded more choice in which English, Math, or Science course they choose (Bruner, 1996; Meier & Gasoi, 2017; Sarason, 2004; Socol, Moran, & Ratliff, 2018).

The K-12 learning experience culminates with graduation from high school and transitions into post-secondary careers, colleges and universities. It's a well-known journey – generations old – a rite of passage for growing up and learning - but, as mentioned earlier, it is a journey of nuanced complexity. Learners come in all cognitive and social-emotional shapes and sizes – and learning is experienced differently by each and every student. Educators' attempts to best meet their students' needs and appetites for learning require constant input – some of which is anecdotal in nature and some of which is rooted in our best attempts to describe and quantify thinking and ability. Describing and quantifying cognition and ability, we are able to identify students who present as

relatively rare and therefore worthy of specialized attention – attention that honors their abilities to traverse curriculum and develop skills faster and deeper than the majority of their peers. These students may perceive with enhanced awareness, make unpredictable connections, and may do so in ways that require induction rather than deduction (Buerk, 2016; Daniels & Piechowski, 2008). Along the way, these learners, these gifted and talented students, may also require strategies that foster creative and flexible processes and learning environments, where the term learning environment conveys the setting, space, time, context, and culture in which educators and students interact and learn (Moehring, 2012; Ozerem & Akkoyunlu, 2015).

The potential of gifted and talented students to contribute is without reproach (Plucker & Peters, 2017). Identifying and developing such potential to contribute is a responsibility of all educators. Eliminating artificially imposed ceilings and barriers to this development requires the opportunities that may diverge from what the majority of students require. This work is the goal of gifted education – or of efforts to educate the gifted students among us – to hone and develop our uniquely able students out of a sense of responsibility, but also because doing so is meant to rightly and justly and fairly meet the needs of gifted learners (Delisle, 2014; Plucker & Peters, 2017).

Data compiled and presented by the National Association for Gifted Children (n.d.) indicates that programming for gifted learners positively influences their futures and that their futures often positively influence humanity. Gifted educational programs and programming nurtures gifted learners to create more intellectual patents, publish more books, earn more doctoral degrees, solve complex scientific and societal problems, and, in short, evolve our species and explore our world (Why Are Gifted Programs

Needed, n.d.). Gifted learners often report feeling pressure to perform well to bring up the assessment scores of their classrooms, schools, and districts (Hertberg-Davis & Callahan, 2013). While positively contributing to the scores of a classroom, school, or district is helpful and even desirable, it cannot be the main focus of gifted education, but rather a helpful side-effect of efforts to teach and develop gifted students. Arguments citing elitist values are best countered by an evolving field of gifted education that seeks to improve its identification and subsequent services – to influence changes in the demographics of gifted learners to develop models that make classrooms welcoming and appropriately challenging environments for gifted learners.

Complimentary to the potential of gifted learners are the immediate needs associated with their day-to-day progression in schools. Encouraged by the creation of gifted programming standards by the National Association for Gifted Children (NAGC Gifted Programming Standards, n.d.) that outline appropriate learning and development, assessment, curriculum and instruction, learning environments, programming, and professional development; recognized leaders in the field of gifted education are evolving state legislation and programs to continue to develop programming requirements meant to simultaneously support the cognitive and affective needs of gifted learners and increase the capacity of future generations of educational leaders and practitioners (Finn, 2014). This capacity will increasingly guide schools and districts to forge forward with their work to identify gifted learners and support them with research-based curricular and programming options that enrich, accelerate, and challenge.

Whereas supports in Special Education and for English Language Learners exist to mainly guide students to grade level expectations, supports in Gifted Education exist to

support and encourage gifted learners to soar and exceed such expectations. Educators must be equipped to work with each and every student – whether to Leave No Child Behind, Race to the Top, or in the case of Gifted Education, "Shoot the Moon." Developing and focusing on Gifted Education programs will push boundaries and realize tremendous human potential.

Persistent Problem of Practice

Opportunities to enhance secondary schooling are becoming more identifiable and accessible in an age of increasing connectivity (Freeman et al., 2017). Such opportunities may include concurrent/dual enrollment, specialized and niche schooling, academic competitions, micro schooling, charter schooling, homeschooling, unschooling/hack schooling, and online schooling - to name a few (Dintersmith, 2018; McFarland et al., 2018; Socol, Moran, & Ratliff, 2018). Participating in these opportunities may result from needs for acceleration, stimulation and challenge, and development of passions and interests pertaining to giftedness (Deng, Connelly, & Lau, 2016).

Calls from students and educators to better reflect societal changes catalyzed by advances in technology will increase students' viable opportunities (Barron, 2006). K-12 district partnerships with community colleges, universities, businesses, along with continued and more focused efforts towards sustainable 21st century competencies will create novel and individualized pathways for current and future generations of students (Dimas, 2018; "Collaboration Campus," n.d.; "Never Stop Innovating," 2018). Gifted students may be among the first to take advantage of such pathways and are therefore worthy participants in a study designed to tell their stories and identify themes and patterns involved in why and how they chose less traditional pathways.

Though developed outside of the field of gifted education, both College Board's Advanced Placement (AP) and International Baccalaureate's Diploma Programme (IB-DP) have been embraced as the primary means of meeting the needs of gifted and talented secondary students (Olszewski-Kubilius & Limburg-Weber, 1999). Present day secondary students, or recent graduates, who have eschewed coursework like AP and IB, have done so in ways worthy of investigation (Hertberg-Davis & Callahan, 2008).

Schools and programs designed to include methods of inductive learning (e.g., expeditionary learning, problem and project-based learning) encourage students to ask sincere and curiosity-driven questions that encourage them towards further discovery and exploration (Berger, 2014; Richardson, 2015). By encouraging these questions through students' high school educations, educators are creating safe, responsive, and welcoming educational environments in which to guide and nurture their students' gifts and intellectual growth. These existing schools and programs are worthy of investigation and study to inform future endeavors and practices with the explicit goal of producing engaging and supportive environments.

The nuanced and complex cognitive and social-emotional needs of high school gifted learners are not sufficiently met through accelerated coursework like AP and IB alone (Hertbert-Davis & Callahan, 2014). Their needs require the design, implementation, and leadership of programs and programming that maximizes students' agency and confidence. Such programming should be fully modern in its conception and thus allow students to construct and share products of their learning: intellectual, community, integrated and interdisciplinary, self-initiated, and creative work that connected technology and speed-of-light communication affords society. Furthermore,

adaptive leadership that receives and acts on this shared information and student contribution will evolve and improve and efforts and products of the programming. Modern high school gifted programming must provide gifted and talented students more opportunity to express their thinking - to enact and demonstrate their learning in increasingly flexible ways that value the students' contributions.

Purpose of the Study

The purpose of this study was to explore high school learning environments designed to maximize the agency, confidence, and curiosity of gifted and talented and twice-exceptional secondary students. The results of this study will inform district and high school educators and educational leaders of programs and programming they can implement to best engage and develop their respective gifted learners. This study aims to inspire efforts to create relevant, community-based educational experiences for high school gifted and talented students.

Research Questions

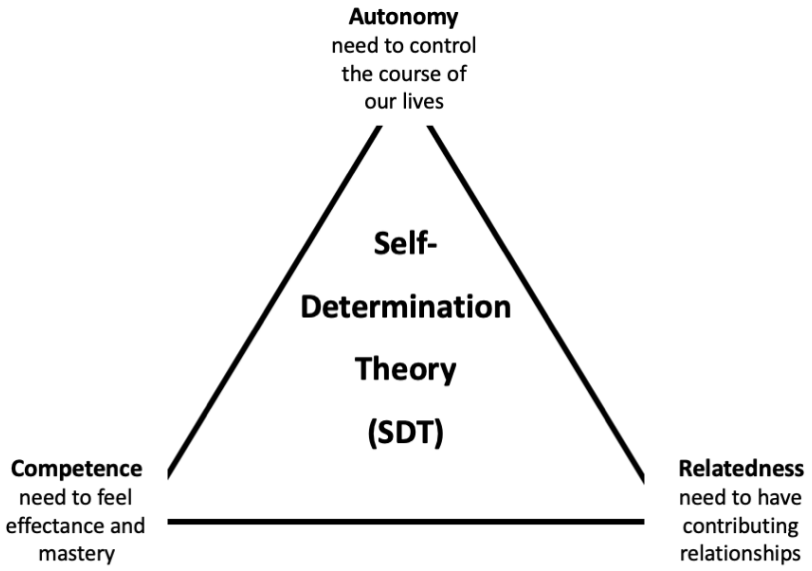
1. How does the learning environment nurture the agency of gifted and talented secondary students?
2. How does the learning environment nurture the curiosity of gifted and talented secondary students?
3. How does the learning environment nurture the confidence of gifted and talented secondary students?

Theoretical Framework and Conceptual Model

Self-Determination Theory (SDT)

SDT is a theory of motivation centrally concerned with the conditions that facilitate or hinder human flourishing (Ryan & Deci, 2017; Ryan & Deci, 2000). It posits that humans have universal psychological needs that, when understood and nourished, contribute to human motivation and overall wellness. According to Deci, Ryan, & Guay (2013), in SDT, flourishing and self-actualization are natural human potentials. Full functioning in SDT is characterized by mindfulness and awareness, autonomous self-regulated activity based in interests and motivations, and the use of intrinsic life goals (Deci & Ryan, 2000; Greene, Miller, Crowson, Duke, & Akey, 2004). The theory proposes that all humans have basic psychological needs: competence, autonomy, and relatedness (see Figure 1.1). These needs are essential for maintaining intrinsic motivation, internalizing extrinsic motivation, and regulating emotions (Guay, Ratelle, & Chanal, 2008; Van Ryzin et al., 2009). The constructs of SDT are important for understanding how GT students can engage and thrive at school when manifested as student agency (voice, choice, and power) over aspects of their learning and education (Almukhambetova & Hernández-Torrano, 2020).

Figure 1.1
The Psychological Needs of Self-Determination Theory (SDT)



Autonomy. The first basic psychological need specific to SDT is autonomy. Autonomy is the need to self-regulate one's experiences and actions (Ryan & Deci, 2017). Autonomy is not the same as independence, or dependence, but rather a need to feel that "they are the masters of their own destiny and they have some control over their lives" (Ackerman, 2018). It is a sense of control over one's own behavior. Autonomous actions are those that can be self-endorsed, and for which one takes responsibility and ownership. (Ryan & Deci, 2017). The opposite of autonomy is heteronomy, which is when one acts out of internal or external pressures that are experienced as controlling.

Competence. In SDT, competence is a basic need to feel effectance and mastery. It concerns achievement, knowledge, and skills (Ackerman, 2018; Ryan & Deci, 2000). Competence can wane when challenge is too difficult, when feedback and criticism of a negative nature is too pervasive, or when interpersonal and social factors regarding mastery and effectiveness are negatively personal and harshly critical (Ryan & Deci,

2017). When one is prevented from evolving skills, understanding, or mastery, their development is inhibited and their psychological need of competence is not being met (Ackerman, 2018).

Relatedness. Also referred to as "connection," relatedness concerns feeling socially connected and to a sense of belonging and to feeling significant among others (Ryan & Deci, 2017; Ryan & Deci, 2000). Relatedness is the basic psychological need of SDT that entails having close relationships with others and to feeling important and valued within a group, system, organization, or network construct (Ackerman, 2018). The degree of relatedness one feels is correlated to one's contributions and to the acceptance of these contributions (Ryan & Deci, 2017). It refers to experiencing others as responsive, sensitive, and caring and, in turn, being responsive, sensitive, and caring to them.

Conceptual Model of Agency

This study broadened from the SDT by studying three concepts in action with regards to gifted and talented students: agency, curiosity, and confidence. A central theme for doctoral research projects and dissertations in practice is a meaningful connection between theoretical ideals and the realm of practice (University of Denver, 2017). The SDT macro-theory was applied to create a conceptual framework and model deemed practically applicable to immediate study in secondary school settings. To create this conceptual model, the three basic psychological tenets and needs comprising the SDT were overlapped with the concepts of student agency, curiosity, and confidence.

Student agency is built on SDT's tenets of autonomy and competence. It is based on students exercising their voice, choice, and power over their learning (Bryant, 2019). In an environment of relatively high student agency, students have voice, choice, and

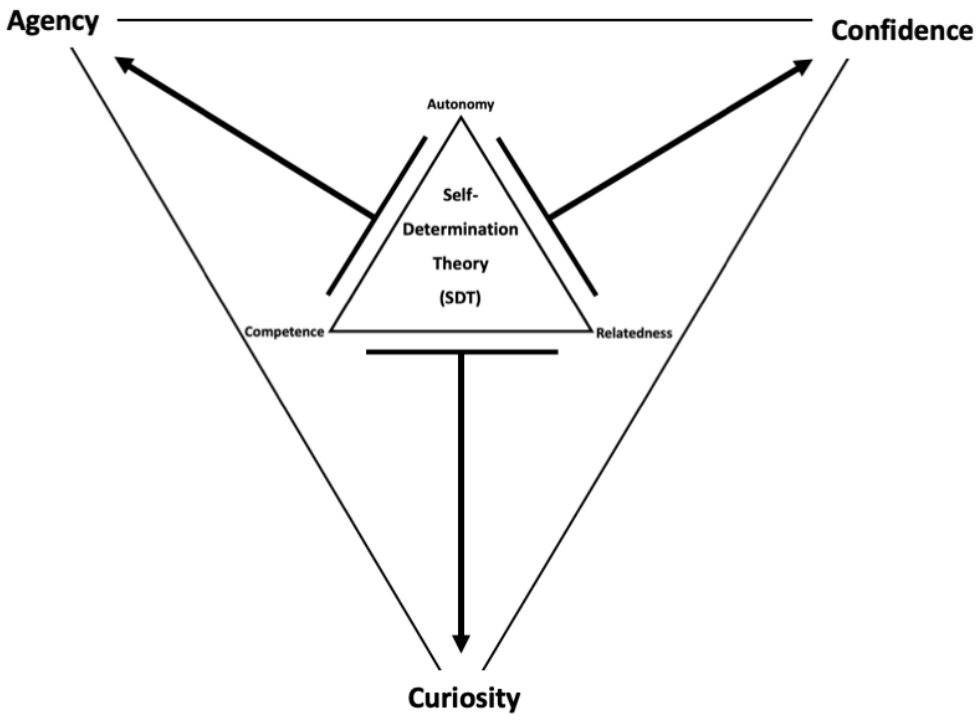
power over what they learn, when they learn it (including their pace of learning), and how they learn. They are autonomously applying their mastery and knowledge (or competency). Agentic students pursue their own internalized goals and are less motivated by rewards and punishments (Bjerede, 2018). Student agency is a positive force, that is, agentic action, is helpful, advancing, and benevolent. Actions that are negative and malicious – yet autonomous – are not considered agentic. Environments that support student agency are ones that support students' learning above all else. These environments activate intrinsic motivation and strive to make opportunities interesting to students, which requires a responsive and dynamic learning environment – one that students contribute to and seek to improve for future students (Bryant, 2019; Richardson, 2015).

Curiosity is fundamental to authentic and sustainable learning. From infancy on, people take interest in and observe, explore, and manipulate their environment (Ryan & Deci, 2017). This study conceptualized curiosity as a product of SDT's tenets of competence and relatedness. Students, when interacting with trusting teachers and peers, are free to share their sincere wonderings and, further, investigate these wonderings and apply their knowledge and mastery. Curious minds are open to exploring ideas that extend well beyond any prescribed or anticipated outcome (Dixon, 2017). Further, by nurturing students' curiosity they are emboldened to ask their driving questions – questions of an inquisitive nature that, when investigated with fidelity, can drive a course, project, curriculum, or program of study (Berger, 2014; Richardson, 2015).

The third concept of this study's conceptual model of agency is student confidence as built on SDT's tenets of relatedness and autonomy. Growth in academic

and interpersonal skills, as well as in one's knowledge of one's self, that is, how one enjoys learning, what one is interested in, and how one gauges progress are aspects of an appreciation and understanding of confidence (Almukhambetova & Hernández-Torrano, 2020). Confidence also entails appropriate selection of cognitive and social-emotional challenge – engaging in manageable projects and activities – and identifying success and failure and reflecting on both. Figure 1.2 is a visual representation of the conceptual model of agency that guides this study to investigate high school learning environments designed to maximize gifted students' agency, curiosity, and confidence.

Figure 1.2
Relationship of SDT and the Conceptual Model of Agency



Curricular and Leadership Frameworks

In studying learning environments, this study will interact with teachers, administrators, and counselors serving in various roles within a school setting. To enhance the conceptual model of agency studied, this study utilized theories of curriculum and leadership. These theories help bound and frame the investigation in terms of participants and setting selection and in the type and scope of data collected. The theories that were used are Constructionism and Adaptive Leadership.

Constructionist Theory. Related to Piaget's theory of constructivism through its sharing of building knowledge through experience, constructionism adds the context that learners construct products of their learning endeavors (Ackermann, 2000; Papert & Harel, 1991). These products are public entities and therefore contributive in nature (e.g., a physical sandcastle on a beach or a theory of the universe). Constructionism holds that learning happens best when learners are engaged in creating personal and meaningful objects and sharing them with their peers and with their communities (Maxwell, 2006; Papert, 1993). Technology, specifically educational technology, can amplify learning and the sharing of students' products and constructs. As such, constructionism aligns with society's ever-evolving uses of technology (Stager, 2018). Constructionism was used to situate site selection criteria and the participant interviews into a frame of contribution and visible constructs of students' learning endeavors. By nurturing the agency, curiosity, and confidence of GT students, the learning environments described in this study afford maximal opportunity for students to purposely construct and program their learning.

Adaptive Leadership. Described by Heifetz et al. (2009), adaptive leadership is an agile and responsive model of leadership and management that diagnoses problems to

provide evidence and motivation for stakeholders to engage in change processes (Wolfe, 2015). The adaptive leadership model likens change to loss. Leaders act to help their colleagues move through losses, which then builds the capacity to move from technical change and into adaptive and more sustainable change as measured by time and impact. This study used the model of adaptive leadership as a framework to describe the leadership activities involved in the programs and schools of this study and interact with school leaders and administrators.

Study Audience, Outcomes, and Implications

An appropriate audience for this study includes school and district curriculum designers and advocates for secondary gifted learners' interests and programming needs, district personnel responsible for supporting gifted and talented education, and classroom teachers seeking to maximize their instructional capacities and their students' learning by providing equitable and personalized impactful opportunities for growth. The results of this study will inform district and high school educators and educational leaders of programs and programming they can implement to best engage and develop their respective gifted learners. This study aims to inform and inspire efforts to improve high school programming for gifted and talented students by describing specific examples of programs and schools that can be studied, adapted, and scaled.

Summary

Gifted and talented high school students represent our collective school system's most capable and promising students. They deserve modern learning opportunities that afford them opportunities to exercise their curiosity by asking and seeking answers to driving questions, to grow as confidence and self-aware learners, and to take control and

ownership of their learning by capitalizing on the agentic actions of voice, choice, and power over the what, when, and how of their learning endeavors. Our increasingly connected and technologically evolving society catalyzes educational shifts towards such opportunities for gifted and talented learners.

Framed and supported by the tenets of the Self-Determination Theory (SDT), this study explored high school learning environments designed to maximize the agency, curiosity, and confidence of gifted learners. In exploring these environments, high school educators shared the goals, expertise, and passion that underlies their efforts to nurture students' autonomy, competence, and relatedness via a conceptual model of agency, curiosity, and confidence

CHAPTER TWO: LITERATURE REVIEW

Overview

This literature review is an exploration into high school gifted programming and the opportunities and options that are afforded high school gifted learners. It begins with a review of the evolving definition of giftedness and of gifted and talented. Such a review demonstrates the broadening nature of the definitions over time to include additional areas of talent and a focus on the nature of gifted learners in general. The review then explores popular forms of gifted programming found in high schools - two of which are acceleration and two of which are based in relationships and enrichment. The next section explores the idea of more holistic programs that can be adopted by schools - these programs can create learning environments that are focused on students' curiosity and passion and are designed to provide students with increasing levels of agency and ownership of their learning. The review then proceeds into a section that explores the modern contexts of learning in an era of ubiquitous connectivity and global perspective. This modern learning context blurs the traditional approaches to education and begs the question, how can gifted learners exercise their agency over their learning to make profound contributions and connections?

Defining Gifted and Talented

A study of gifted and talented (GT) programs and programming must begin with a discussion of the definitions of giftedness and of gifted and talented. The types of

educational programming and practices employed by educators and administrators are decisions shaped and driven by foundational beliefs (Callahan & Hertberg-Davis, 2013). Myths exist regarding giftedness and gifted education (Cross, 2011). Often these myths originate from educators' long-held beliefs based on select students they have interacted with and taught over their years of experience or on what the educators believe is necessary to achieve and perform well in school (Treffinger, 2009). These myths can manifest themselves as ineffective curriculum and programming for identified gifted learners. An understanding of giftedness and its various conceptions and definitions over time is vital when studying programs designed and implemented for students identified as GT (Ayers Paul & Moon, 2017).

Giftedness was originally defined based on intelligence quotient (IQ) scores that statistically compared one's measured intelligence test scores to that of the general population (Silverman, 1989). The history of gifted education in the United States parallels the evolution of public education and major world events ("A Brief History of Gifted and Talented Education," n.d.). Table 2.1, informed by the work of Coleman (1999), Sayer (1999), and Imbeau (1999), describes events and themes of the 20th century that have shaped gifted education.

Table 2.1
Events that Have Shaped Gifted Education

Event	Description
Intelligence testing	Lewis Terman studies individuals who score at the upper limits of the Stanford-Binet Intelligence Test. The test was previously used to study individuals at the lower limits. Terman sought to confirm that highly intelligent individuals were in need of specialized development.

World Wars	World War I and World War II intensely required the identification and cultivation of leadership. The dynamics associated with these wars fostered leadership capabilities and skills specific to materials, weaponry, human rights, and democracy.
Sputnik, Legislation, and Educational Funding	Russian's successful launch of Sputnik 1 in 1957 sparked national efforts to identify talent in the areas of mathematics and science and to international benchmarking and competitive comparison. The Sputnik event focused Congress to allocate more funding for advanced students. Such legislation resulted in the publication of the Marland Report (Marland, 1972), the establishment of the Javits Act and the Federal Office of Gifted and Talented, and the National Research Center on the Gifted and Talented.
Civil Rights	Reconsideration of all groups in whom talent may be found - continues as one of the most significant challenges for gifted education today
Organizations	The formation of The Association of the Gifted (CEC-TAG) and the National Association of the Gifted and Talented (NAGC) have influenced the field of gifted education through research, policy, teacher development, and professional standards.
Creativity	Programs that emphasize creativity have become increasingly common in the nation's schools as schools and districts seek to innovative practices and performance-based assessments.
School Reform	The implementation of differentiated instruction and specialized schools and programs fueled by technological advances is providing better matches of students' capabilities and interests.
Emerging Understanding of Brain Function	Increasingly sophisticated methods of scanning and observing human brain biochemistry will have profound effects on education and on gifted education and will impact our understanding of how humans learn and develop.

As these world events unfolded and impacted education and gifted education, the conception and definition of gifted and talented and of giftedness evolved from narrow, intellectually based conceptions to broader and more inclusive definitions. McClain & Pfeiffer (2012) summarize these changes:

> Originally, educators defined gifted or talented more narrowly and only considered the constructs of achievement and/or intelligence—which increased the probability that certain youth with nonacademic gifts would be excluded from gifted consideration. However, over the past two decades, definitions of giftedness have broadened to include abilities related to leadership, creativity, and the arts. The term gifted has been removed from many current definitions, reflecting a more contextual, developmental, and talent development perspective. (McClain & Pfeiffer, 2012, p. 61)

As mentioned, Terman and Hollingworth defined giftedness based on a high score on an achievement test (Silverman, 1989). Years later, in 1969, the definition broadened as the first federal definition of GT appeared in the amendments to the Elementary and Secondary Education Act of 1965: "Gifted and Talented children have outstanding intellectual ability or creative talent" (U.S. Congress, 1970, p. 192).

This definition did not specify the nature of "intellectual ability or creative talent but did add that such children require "special activities or services not ordinarily provided by local educational agencies" (U.S. Congress, 1970, p. 152). The additional mention of activities and services distinguishes this definition as it is the first to require some form of programming specific to outstanding intellectual ability or creative talent.

Also, in 1970, Congress called for a report on the status of gifted and talented students. Sidney Marland, the U.S. Commissioner of Education published the report in 1972. In the report was an expanded definition of giftedness and talent:

> Gifted and talented children are those identified by professionally qualified persons who by virtue of outstanding abilities, are capable of high performance.

> These are children who require differentiated educational programs and/or services beyond those normally provided by the regular school program in order to realize their contribution to self and society. (Marland, 1972)

Children capable of high performance include those with demonstrated achievement and/or potential ability in any of the following areas, singly or in combination:

1. General intellectual ability
2. Specific academic aptitude
3. Creative or productive thinking
4. Leadership ability
5. Visual and performing arts
6. Psychomotor ability (Marland, 1972)

The Marland Report (as the report is now referred to) thus further broadened the nature of giftedness by specifying "professionally qualified" persons as appropriate to identify GT students, by including specific reference to differentiated educational programming, and by describing six areas (or domains) of achievement and ability (Jolly, 2009). Marland's definition of giftedness expands into new areas: specific aptitude, which refers to work within a subject area (e.g., science, mathematics, language arts, etc.); creative or productive thinking, which expands on the 1970 definition of giftedness by synthesizing productive thinking with creativity; leadership, which involves interpersonal communication skills; visual and performing arts, which manifest in drama, painting, drawing, and music; and psychomotor abilities, which include movement and spatial skills (Giftedness and the Gifted, 1990).

The Marland definition of giftedness continued to be modified until, in 1993, a new federal definition was published by the U.S. Department of Education. This definition includes areas mentioned by the Marland Report definition but adds much to the breadth of where talent and gifts are found and how schools are expected to meet the needs of gifted students.

> Children and youth with outstanding talent perform or show the potential for performing at remarkably high levels of accomplishment when compared to others of their age, experience, or environment. These children and youth exhibit high performance capability in intellectual, creative, and/or artistic areas, possess an unusual leadership capacity, or excel in specific academic fields. They require services or activities not ordinarily provided by the schools. Outstanding talents are present in children and youth from all cultural groups, across all economic strata, and in all areas of human endeavor. (U.S. Department of Education, 1993, p. 26)

This definition makes clear that giftedness is marked by a sense of not normal - that is, giftedness and being gifted lives on the edges of what is typical in terms of intellect, performance, and potential. Where giftedness and gifted and talented was once defined according to achievement and measured intelligence (IQ), it has now broadened to include those who may not present with academic gifts (McClain & Pfeiffer, 2012).

The landmark No Child Left Behind (NCLB) legislation mentioned giftedness and provided yet another definition that heralded back to the Marland definition of 1972 and was a less contemporary version than that released in 1993 by the U.S. Department of Education. According to the No Child Left Behind Act (2002):

> The term “gifted and talented”, when used with respect to students, children, or youth, means students, children, or youth who give evidence of high achievement. Capability in areas such as intellectual, creative, artistic, or leadership capability, or in specific academic fields, and who need services or activities not ordinarily provided by the school in order to fully develop those capabilities. (No Child Left Behind Act, 2002, p. 1959)

NCLB, as legislation of school accountability, also highlighted gifted and talented students as a subgroup for schools and states to include as part of their Adequate Yearly Progress (AYP) reports.

> … Such as achievement on additional State or locally administered assessment, decreases in grade-to-grade retention rates, attendance rates, and changes in the percentages of students completing gifted and talented, advanced placement, and college preparatory courses. (No Child Left Behind, 2002, p. 1447)

While including a less contemporary definition of giftedness and gifted and talented, NCLB partially reversed the trend of broadening GT definitions. Further, by its mention of advanced programming and college preparatory courses, the Act narrowed the programming options for gifted learners, especially at the secondary level (Meier & Wood, 2004).

Outside of Federal definitions of giftedness, organizations and prominent educators in the field of gifted education have also contributed much to the developing and evolving views of GT. Here are the definitions from the National Association for Gifted Children (NAGC), Columbus Group, and Annemarie Roeper:

> NAGC: Gifted individuals are those who demonstrate outstanding levels of aptitude (defined as an exceptional ability to reason and learn) or competence (documented performance or achievement in top 10% or rarer) on one or more domains. Domains include any structured area of activity with its own symbol system (e.g., mathematics, music, language) and/or set of sensorimotor skills (e.g., painting, dance, sports). (NAGC, "What is Giftedness," n.d.)

> Columbus Group: Giftedness is asynchronous development in which advanced cognitive abilities and heightened intensity combine to create inner experiences and awareness that are qualitatively different from the norm. This asynchrony increases with higher intellectual capacity. The uniqueness of the gifted makes them particularly vulnerable and requires modifications in parenting, teaching and counseling in order for them to develop optimally. (Morelock, 1992)

Annemarie Roeper: “Giftedness is a greater awareness, a greater sensitivity, and a greater ability to understand and transform perceptions into intellectual and emotional experiences” (Roeper, 1982).

The NAGC, Columbus Group, and Roeper definitions of giftedness contribute to the areas of identification of GT and to understanding how GT students think, feel, and learn (Kaufman, 2013). They have contributed to increased efforts towards supporting social-emotional needs of gifted learners. In doing so they have added to previous renditions of giftedness and gifted and talented that focus on intelligence and on domains of giftedness. This work and the federal definitions shared previously have impacted how states define giftedness and gifted and talented. According to Ayers Paul & Moon (2017), 48 states have adopted definitions of giftedness, though their uses of terms vary:

- 27 states use the term “gifted and talented”
- 18 states use only the term “gifted”
- 3 states use the term “high ability” (Ayers Paul & Moon, 2017)

Several of the learning environments described in this study are located in the state of Colorado. The Colorado Department of Education’s definition of gifted and talented includes mention of domains of giftedness, gifted students with disabilities, and the need for modifications in programming:

> Gifted and talented children means those persons between the ages of five and twenty-one whose abilities, talents, and potential for accomplishment are so exceptional or developmentally advanced that they require special provisions to meet their educational programming needs. Children under five who are gifted may also be provided with early childhood special education services.
> Gifted students include gifted students with disabilities (i.e. twice-exceptional) and students with exceptional abilities or potential from all socio-economic and ethic, cultural populations. Gifted students are capable of high performance,

exceptional production, or exceptional learning behavior by virtue of any or a combination of these areas of giftedness:

> General or specific intellectual ability
> Specific academic aptitude
> Creative or productive thinking
> Leadership abilities
> Visual arts, performing arts, musical or psychomotor abilities (CDE, n.d.)

Though governmental and non-governmental organizations and experts in the field of gifted education do not agree on a single official definition of giftedness, review of current and historical definitions yield themes of potential, exceptionality, programming needs, unique, and intellectual and emotional (Ambrose et al., 2010; Dai & Chen, 2014; Subotnik et al., 2011).

High School Gifted and Talented Programming

As the definitions of gifted and giftedness evolved, they broadened to include language specific to schools and to educators providing programming options to challenge identified gifted learners and to support them reaching their potential (Kettler, 2016).

Asynchronous development, mentioned in Columbus Group's definition of giftedness, is an uneven cognitive development that increases in intensity with higher intellectual capacity (Morelock, 1992). By the time gifted learners enter high school they may be on completely different trajectories of development than their non-gifted peers (Jacobs & Eckert, 2017). The results of this asynchrony and the various trajectories of gifted learners creates the need for specific programming and gifted education programs (Dixon & Moon, 2015). Most high schools nowadays offer a menu of accelerated

coursework and programming that may entice gifted learners. Jacobs & Eckert (2017) refer to these offerings as cornerstones:

> One of the cornerstones of any high-quality service or program for secondary gifted students is to provide curricular offerings that deliver challenge, choice, and engagement. There are multiple academic programs and strategies that can help ensure that gifted adolescents have opportunities to learn new information and skills every day. (p. 103)

What follows is a review of the cornerstone programming afforded most gifted and talented high school students: AP and IB coursework, concurrent and dual enrollment, internship and mentorship, and academic competitions.

Advanced Placement (AP)

AP programming was created in the 1950s to allow high school students to earn college-level credits while still in high school. The initial year of AP served 1,229 students in the United states and has grown ever since. In 2005, over 1.2 million high school students were enrolled in one or more AP course (Hertberg-Davis et al., 2006). There are presently 38 unique AP courses that are offered to high school students. College Board (n.d.) mandates a specific syllabus for each course and offers training to AP teachers. Each course culminates in an exam that is scored on a 5-point scale that is used to assess how much (if any) college credit the student will receive based on his or her testing scores and results.

AP courses offer students the potential to save tuition and money in college as high school students may enter college with enough credits to begin college as second-year students (College Board, n.d.). Foust et al. (2008), Hertberg-Davis et al. (2006), and Hertberg-Davis & Callahan (2008) stress concern that AP courses may not be the best option for gifted learners due to rigid, inflexible, and voluminous coursework that does

not tend to include conceptual thinking as much as it does accumulated knowledge and information. They also stress that an AP program of study on its own should not be considered a school or district's gifted program:

> The AP program does not provide students opportunities for innovative and creative production applied to real-world, professional investigation, but instead focuses on the acquisition of knowledge and skills for performance on the end-of-course exams. (Hertberg-Davis & Callahan, 2008, p. 71)

International Baccalaureate (IB)

The IB Program is a global educational initiative that was first introduced in the United States in 1970 (International Baccalaureate Organization, n.d.). Originally a program designed to meet the needs of military and diplomatic families, the program has grown to serve elementary (ages 3-12), middle (ages 11-16), and high schools (ages 16-19) (Byrd et al., 2007). The IB Program is divided into six groups: Language (literature), Second Language (foreign language), Individuals and Societies (e.g. history, economics), Experimental Sciences, Mathematics and Computer Science, and The Arts. Diploma Programme students are required to take courses from each group. Most subjects are offered at two levels, Standard Level (SL) and Higher Level (HL) with HL requiring more course hours. Students take end-of-course exams to supplement their course grades. Like AP, IB courses adhere to standard curricular requirements and syllabi (International Baccalaureate Organization, n.d.). Unlike AP, IB students must complete additional programmatic work and projects to graduate high school with an IB diploma. Byrd et al. (2007) list these requirements as follows: Extended Essay, Theory of Knowledge course, and community service work (CAS). The IB Program focuses on common experiences for students that include choice of extended essay topic and CAS direction, which raises

IB to the level of a program worthy of gifted students. Further, IB Program teachers are required to attend frequent training workshops and conferences.

AP and IB Summary

Data and studies supporting the appropriateness of AP and IB coursework and programming for gifted learners is limited (Hertberg-Davis et al., 2006). Both AP and IB remain popular in high school due to their accelerated content and status as challenging courses. Adapted from Hertberg-Davis et al. (2006), Table 2.2 summarizes some key findings regarding AP and IB courses and programming.

Table 2.2
Two Hands of AP and IB

One the one hand …	On the other hand …
AP and IB classes offer high levels of challenge, broader coverage, and greater complexity of concepts	Students and teachers in AP and IB often define challenge as "more work" Emphasis on covering material on the end-of-course exams causes emphasis on breadth over depth in AP courses
Perceived rewards associated with AP and IB Students perceive AP and IB courses as worth the effort they expend on them	Students tend to choose AP and IB because of perceived rewards rather than interest The reputation of these courses often prevents students from questioning what and how they are learning
AP and IB are among the only programs and courses for advanced and gifted high school students, providing a structured curriculum	AP and IB teacher training experiences are varied and inconsistent Inconsistencies in training lead to inconsistencies in the way courses are taught and the challenge provided
Students enjoy and value the opportunity to work with similarly motivated students	Limited recruiting practices lead to underrepresentation of minority students and students form low-SES backgrounds

Students perceive AP and IB teachers as providing the best and most challenging instruction in the school	Curriculum and instruction in these courses are geared toward motivated students with a history of school success
AP and IB courses are generally perceived by teachers and administrators as the pinnacle of academic rigor and challenge at the high school level	AP and IB courses do not meet the academic needs of all high school gifted students, but high school faculty and administrators do not seem to be developing or considering a range of other options for advanced students.

Concurrent and Dual Enrollment

Where AP and IB are programs offered by College Board and International Baccalaureate Organization, respectively, high school concurrent and dual enrollment are partnerships between a high school or district and local community colleges and universities (Jacobs & Eckert, 2017). Students attend college courses in the case of dual enrollment. Concurrent enrollment requires high school teachers to meet specific criteria outlined by the partnering college or university. When the criteria are met the teacher can teach the college course at the high school rather than at the college campus. According to Kilgore & Wagner (2017), 47 states have dual and concurrent enrollment policies and funding with 10 of these states requiring public high schools and postsecondary institutions to partner and provide dual and concurrent enrollment opportunities. High schools are increasingly looking to dual and concurrent enrollment for college and accelerated programming opportunities to their students (Cassidy et al., 2011).

Though the quality of the coursework may vary more than with AP and IB due to the increased number of partnerships and the dynamic of the partnering college or university, there are several benefits to dual and concurrent enrollment (Cassidy et al., 2011; Karp, 2012):

- Help prepare students for the rigors of college
- Improve student motivation by offering interesting courses
- Promoting relationships between colleges and high schools
- Provide a college experience to underserved populations
- Provide an accelerated pathway to a college degree
- Increasing the likelihood that high school students will graduate from high school and enroll in college (Cassidy et al., 2011; Karp, 2012)

Dual and concurrent enrollment requires careful coordination between partnering high schools and colleges (Marken et al., 2013). Kilgore & Wagner (2017) studied dual and concurrent enrollment and, in doing so, surveyed K-12 and higher education administrators with respect to the values of dual and concurrent enrollment and to the perceived barriers to such programs.

Values

- Demonstrate that college is achievable
- Great for first-generation students
- It's a confidence builder
- Students can earn an associate degree while in high school
- Pique the interest of high school students
- Enhance the experience of advanced students

Barriers

- Difficulty in sharing information between high schools and college
- Lack of scheduling alignment between high schools and colleges

- Lack of transportation for students
- Tremendous amount of paperwork (Kilgore & Wagner, 2017)

As acceleration, similar to AP and IB, dual and concurrent enrollment provides gifted learners opportunities to experience college-level coursework while in high school. Dual and concurrent enrollment, however, adds direct experience with colleges, either by students taking courses on their campuses or by their requirements of high school teachers who desire to teach dual/concurrent courses (Karp, 2012). Dual and concurrent enrollment, Advanced Placement, and International Baccalaureate all provide accelerated learning opportunities to motivated high school students. They do so, however, by offering courses of rigid curricula that are not easily adapted or differentiated to the needs and interests of gifted and talented students (Hertberg-Davis et al., 2006).

Internship and Mentorship

Mentorships and internships are other options for high school students to study and investigate topics in more depth than in traditional classroom settings (Callahan & Kyburg Dickson, 2014). The term "mentor" has been defined from a teacher "who models learning skills daily to a student to encourage life-long learning" (Bisland, 2001) to a "guide, advisor, model, counselor, and friend who helps advance the student's knowledge of a particular field" (Silverman, 1993). Mentors (through mentorship and internship) serve as role models who nurture gifted students' creativity, assist with career exploration, and help provide enrichment and challenge in content areas. Most importantly, mentors help gifted students become increasingly self-aware (Berger, 1990).

High schools and programs that coordinate mentorship and internship programs can add much to the lives and development of their students.

> Gifted students can benefit from relationships with adults who are successful in their areas of interest. These adults may be present in children's lives as mentors, role models, or heroes and heroines. The relationships that develop range from close, interactive partnership to admiration or imitation of public figures. (Pleiss & Feldhusen, 1995)

Such programs can enrich students' deep interests and passions and bridge gaps between the students' abilities and what they learn in their classrooms. Though coordination can be time-consuming and challenging, providing gifted students with mentorship and internship opportunities will add real-world context to students' learning (Jacobs & Eckert, 2017).

Academic Competitions

Talent searches in the areas of science, technology, engineering, and mathematics (STEM) often take the form of various academic competitions designed for able and motivated students (Omdal & Richards, 2014). An academic competition is an event or a variety of events during which individual students or groups of students display or demonstrate projects that they completed or prepared for prior to the event itself. These projects and events enrich gifted students' learning experiences. According to Byko (2004), "Much of what successful students must learn to compete for science prizes is not taught in high school" (p. 15), thus the nature of academic competitions is such that motivated and gifted students are encouraged and challenged to both apply their classroom learning and to forge ahead with creative problem-solving that often places competition students in contact with content and field expertise in the form of coaches, advisors, and mentors.

Motivation is of particular importance when considering students for academic competitions. Baird & Shaw (1996) studied Science Olympiad and found that pre-

assessment of participants' prior knowledge and skills did little in the way of predicting their success in a competition setting. Academic competitions, therefore, may serve to reach gifted and motivated students who may not be highly achieving in their schools. Research conducted by Campbell & Walberg (2010) and by Campbell et al. (2000) into the Math, Physics, and Chemistry Olympiad competitions suggests that students' efforts and participation in the programs has had lasting and sustainable impacts on their lives:

> Of those followed up with, 76% of the 'Olympians' and 70% of their parents stated that they would not have accomplished as much without the programs. In addition, 76% of the Olympians and 76% of their parents judged the program as a help to them in accepting their talents. Most of the Olympians and their parents responded that they thought the program raised their awareness of educational possibilities, increased their confidence, validated their exceptional ability, and helped them set higher goals for their futures. (Campbell & Walberg, 2010, p. 14)

Omdal & Richards (2014) conclude that academic competitions can have three far-reaching and positive impacts on participants:

- Content-based academic competitions develop mentor relationships, research opportunities, and networking
- Growth and development of positive work habits
- Experience with real-world projects and problem-solving to pique students' interests (Omdal & Richards, 2014, p. 11)

Table 2.3 organizes several of the academic competitions that are available for motivated and gifted students and interested educators.

Table 2.3
Popular High School Academic Competitions for Gifted Learners

Competition	Resource
Academic Decathlon	https://www.usad.org

Destination Imagination	https://www.destinationimagination.org/challenge-program/tournaments/
First Robotics	https://www.firstinspires.org/robotics/frc
International Science and Engineering Fair	https://www.societyforscience.org/intel-international-science-and-engineering-fair
International Mathematical Olympiad	https://www.imo-official.org
Natural History Day	https://www.nhd.org
Odyssey of the Mind	https://www.odysseyofthemind.com
Science Olympiad	http://soinc.org
Speech and Debate	http://speechanddebate.org

Gifted Curriculum and Programs

Whereas the previous section described more typical and popular programming for high school gifted learners, this section describes programs and models that are specifically designed for gifted learners around their characteristics, nature, needs, and tendencies.

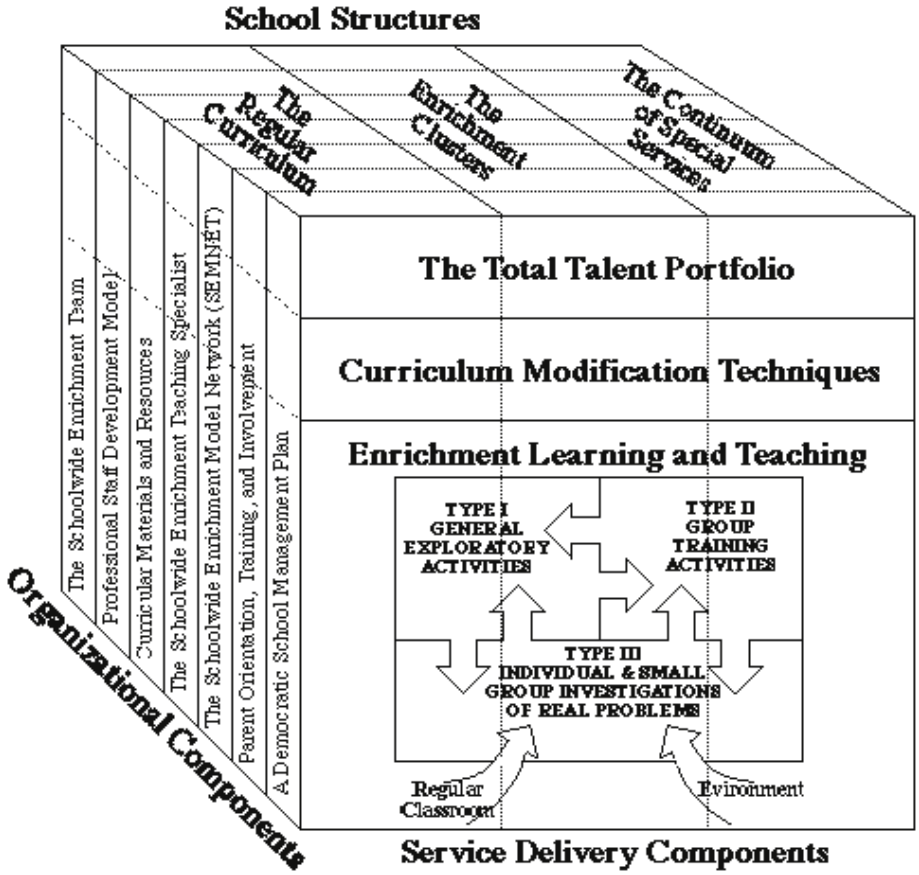
School Enrichment Model (SEM)

The School Enrichment Model (SEM) evolved after over a decade of research and field testing to determine its potential to engage gifted learners and its effectiveness in a schoolwide setting (VanTassel-Baska & Brown, 2007). It was synthesized from the combination of The Enrichment Triad Model (Renzulli, 1977), a model of gifted instruction that focuses on student interests and creative productivity, and an identification model called The Revolving Door Identification Model (Renzulli et al., 1981). SEM, therefore, is a model that identifies and invites students to participate in learning centered on their interests, curiosity, and creativity (Renzulli & Reis, 2013).

The SEM consists of three levels, or types, of enrichment: Type I, Type II, and Type III. Type I Enrichment exposes students to "a variety of disciplines, topics, occupations, hobbies, person, places, and events that would not be ordinarily covered in the regular classroom" (Renzulli & Reis, 2013, p. 201). Type II Enrichment is designed to promote the development of thinking and feeling processes. During Type II Enrichment students engage in creative thinking, problem solving, critical thinking, and affective processes communicated via oral, written, and visual methods (p. 202). Type III Enrichment (Investigations) are self-selected by students willing to commit time and energy to become primary investigators. These investigations delve into advanced areas and produce authentic products as outcomes. In Type III SEM, students "develop self-directed learning skills in planning, organization, resource utilization, time management, decision making, and self-evaluation" (p. 202).

Implementation of the SEM program is a systematic and scaffolded process designed to promote schoolwide implementation with fidelity in regular classrooms and in accelerated high school classes (e.g. AP, IB, and honors). Figure 2.1 is a visual of the SEM that shows the scope and depth of the program across a schoolwide setting.

Figure 2.1
The School Enrichment Model (SEM) (Renzulli & Reis, 2013)



Studies conducted by Baum (1988), and Emerick (1992) have found the SEM to be successful with twice-exceptional and with underachieving students. Yet, despite its studied success, the SEM is not widely implemented in high schools, much to the detriment of gifted learners. State testing and accountability, lackluster educational leadership, and a trend toward differentiation for all are factors that impede the implementation of the SEM (VanTassel-Baska & Brown, 2007).

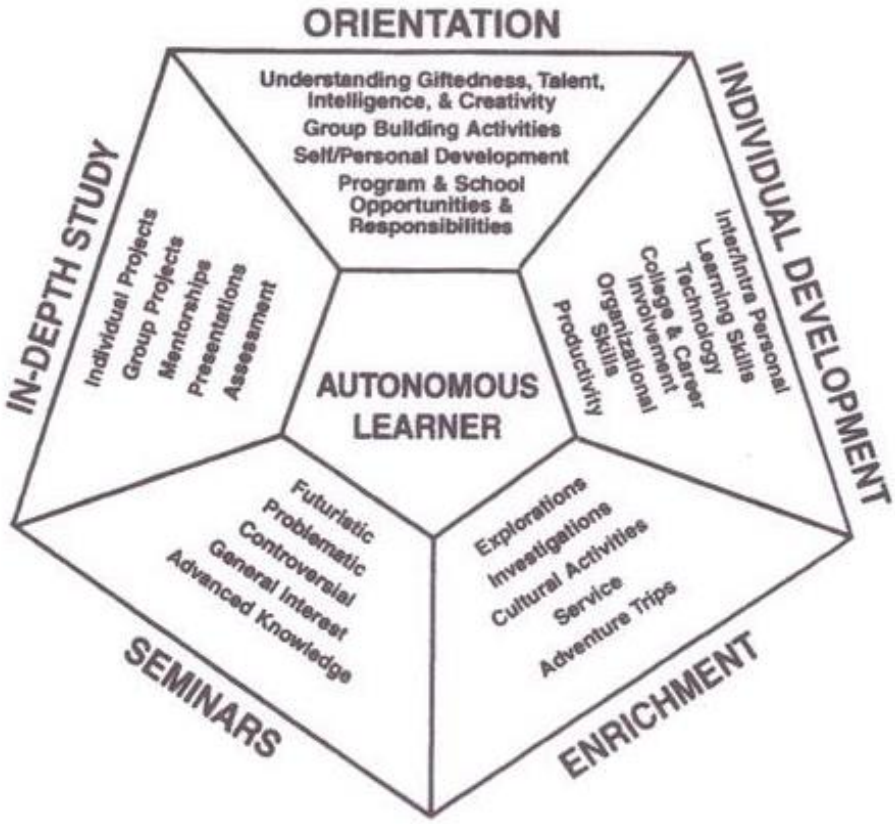
Autonomous Learner Model

The Autonomous Learner Model (ALM) was developed with the input of students. It is a model designed to empower students and thus be "owners of their learning" (Betts, 2003, p. 38). According to Betts & Kercher (1999) several aims of the ALM are to

- Develop skills to interact with others
- Develop critical and creative thinking
- Develop decision-making and problem-solving skills
- Develop passion area(s) of learning
- Become responsible, creative, independent, life-long learners (Betts & Kercher ,1999)

The ALM consists of five dimensions (see Figure 2.2). Dimension One (Orientation) underlies the entire process by "focusing on the understanding of self, importance of working in a group, process of lifelong learning" (Betts, 2003, p. 39). Dimension Two (Individual Development) is designed to "give students the appropriate skills, concept, and attitudes necessary for their development as life-long learners" (p. 40). Dimension Three (Enrichment) encourages learners to explore and investigate areas of interest and passion. Dimension Four (Seminars) are developed by learners in the following areas: future, problem, controversy, general interest, and advanced knowledge (Betts, 2003, p. 60). Dimension Five (In-depth Study) incorporates the work of E. Paul Torrance (1983) to encourage life-long learning - to peruse an idea with intensity, to take pride in and enjoy your greatest strengths, and to learn to free yourself from the expectations of others.

Figure 2.2
The Autonomous Learner Model (ALM) (Betts, 2003).



The ALM, like the SEM, may struggle in high school settings if it is pitted against AP and IB programming. Betts (2003) suggests that an ALM program instead could be used across all four years of high school and could complete the Orientation Dimension and then students and teachers together can make decisions which of the other dimensions they should attempt.

NAGC Programming Standards

Mentioned earlier, the NAGC is an organization that has contributed a definition of giftedness and of gifted and talented. Additionally, NAGC has written and published programming standards that may be used to build and evaluate high school gifted

programming (Johnsen, 2014). There are six standards: learning and development, assessment, curriculum planning and instruction, learning environments, programming, and professional development (NAGC, 2010). The standards document prepared by NAGC includes a description of each standards, student outcomes, and evidence-based practices. Of the NAGC gifted programming standards, Johnsen (2014) asserts that "educators are able to identify classroom practices essential for improving outcomes for gifted and talented students" and that "they may also be used as a guide for professional development in schools and for designing courses in teacher preparation programs" (p. 282).

Implementation of any gifted education program similar to the SEM of ALM should incorporate the NAGC gifted programming standards for purposes of consistency and evaluation over a period of time (VanTassel-Baska & Feng, 2004). The NAGC standards can therefore serve as an effective framework to use when designing gifted programming for gifted high school students.

Principles of Gifted Curriculum

In addition to the NAGC standards, educators seeking to design and implement effective gifted programming should incorporate the seven principles of a curriculum for the gifted that were written by the National/State Leadership Training Institute on the Gifted and Talented (N/SLTI-G/T) in 1979. This list of principles can be used as guidelines, as opposed to a standard curriculum, when designing learning experiences for and with gifted learners.

1. Focus on complex and in-depth study of major ideas, problem, and themes that integrate knowledge within and across a system of thought.

2. Allow for the development and application of productive thinking.
3. Enable gifted learners to explore constantly changing knowledge and information.
4. Encourage exposure to, selection of, and use of specialized and appropriate resources.
5. Promote self-initiated and self-directed learning and growth.
6. Provide for the development of self-understanding and understanding of one's relationship to persons, societal institutions, nature, and culture.
7. Involve evaluations of the curricula stressing higher-level skills, creativity, and excellence in performance and products (Hertberg-Davis & Callahan, 2014).

The curricula, standards, and principles in this section were specifically designed for gifted learners and should be considered when creating gifted programming opportunities for high school gifted learners.

Gifted Education in the Context of Modern Learning

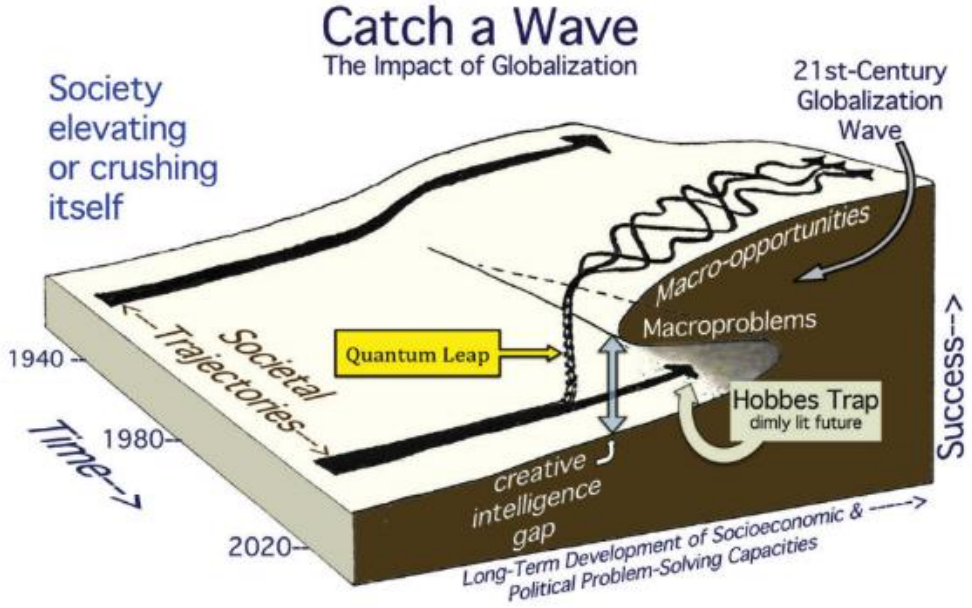
> It is a good time to think differently about curriculum in gifted education, not because our previous thinking was not sufficient. In fact, curriculum thinkers in our field have displayed remarkable vision bringing innovation to curriculum and instruction for decades. We need to think differently because we are more explicitly focusing on developing eminence and elite levels of talent in an era of ubiquitous information and technology. (Kettler, 2016, p. 12)

Kettler's statement delves into the future of gifted education and programming. By mentioning eminence and its development in an era marked by "speed of light" connection and global networking and contribution, Kettler asserts that the field of gifted education is ripe for change and modernized improvement.

Ambrose and Sternberg (2016) ask "if gifted and talented young people are ready to handle the complex 21st-century socioeconomic, political, cultural, and technological conditions when they move into adulthood" (p. 3). Ambrose (2016) describes the "wave" of globalization that is presenting the world with interdisciplinary macroproblems and macro-opportunities that he defines as "high-impact, global, long-term, transdisciplinary difficulties that threaten to harm or even devastate the lives of billions around the world" (p. 15). Examples of macroproblems include climate change, resource shortage, the erosion of democracy - examples of macro-opportunities are new forms of scientific networking, innovative technologies, and the "strength of diverse minds when grouped together for complex problem solving" (p. 15).

The idea of "21st Century Skills" (Partnership for 21st Century Sills, 2011) in education is gaining momentum in many areas, but such skills have been a part of gifted education for decades (see the previous section and SEM and ALM as examples).

Figure 2.3
Catch a Wave: The Impact of Globalization (Ambrose, 2016)



Schools need to provide alternatives to AP and IB so high school gifted and talented students can experience educational opportunities appropriate for their needs and for the increasingly globalized needs of our world (Hertberg-Davis et al., 2006). Gifted learning environments may become increasingly interdisciplinary and interest-based and may indeed catalyze educational policy away from the narrowing NCLB era and into an era of more student-centered and creative elements that empower students and maximize their agency and contribution (Zhao, 2009; Ravitch, 2010; Meier & Wood, 2004). Here, according to Ambrose (2016) and Renzulli (2012) are 21st-Century Knowledge, Skills, and Dispositions for the design of modern learning experiences for gifted learners:

Knowledge and Skills:

1. 3R's (Read, Write, and Compute)
2. Multipole Literacies (linguistic, visual, technological)

3. Creative, Divergent Thinking
4. Nuanced, Critical Thinking
5. Interpersonal Acumen
6. Connective, Interdisciplinary Thinking
7. Panoramic Scanning/Wisdom, Intelligence, and Creativity Synthesized

Dispositions:

1. Intrapersonal Discovery (talents, interests, purpose)
2. Appreciation for Cognitive Diversity
3. Aesthetic Appreciation
4. Altruism (Ambrose, 2016; Renzulli, 2012)

Related Research Studies

There are numerous studies of schools that offer gifted programs to their students. Most of these studies occur at the elementary level rather than the secondary and high school level. Brigandi (2015) conducted a study of academic enrichment, achievement attitudes, and the resultant behavior of 10 gifted secondary students. Findings indicated a relationship between participation in Type III Enrichment and achievement orientation attitudes.

Robinson (2013) studied what constitutes an appropriate secondary curriculum for academically gifted learners by profiling the Governor's School of North Carolina. The case study research examined how the school's curriculum and instructional approaches have addressed the needs of secondary gifted learners and used the Integrated Curriculum Model (ICM) as its theoretical framework. One of the study's three research questions

centered on the affective needs of gifted learners and whether the school's use of ICM could help students enhance their self-understanding.

Roberts (2013) conducted a case study of The Gatton Academy, a state residential high school for gifted and high-ability students focused on mathematics and science located in Kentucky. Courses and curriculum at Gatton are taught contextually using methods of experiential and problem-based designs blended with university-level coursework: "Students at The Gatton Academy remain enrolled at their home high school while also fully engaging as a student at Western Kentucky University" (Roberts, 2013; Roberts et al., 2016).

International studies of secondary schools in Canada and Australia have investigated the of role student agency in engagement (Code, 2010; Quinn & Owen, 2016). These studies utilized quantitative methods of survey and questionnaire to analyze agency and self-efficacy compared to academic achievement. They have proposed a causal relationship between these factors and urge additional research be conducted into the role of agency and self-efficacy and student learning (Code, 2010).

Mizrahi (2018) studied the problem of underachievement with gifted and creatively gifted high school students. The study used extensive interviewing techniques to collect data regarding the students' underachievement and underlying phenomenon. Mizrahi considered learner agency and self-theories through mindsets, which is consistent with the theoretical framework to be utilized in this study of high school learning environments for gifted learners.

Few, if any, recent studies research high school gifted learning environments designed to maximize student agency, confidence, curiosity in dynamic and modern

contexts that encourage interdisciplinary study. Almukhambetova and Hernández-Torrano (2020) explored gifted students' adjustment from high school to university through the lens of self-determination and motivation. Like Mizrahi (2018), they aimed to better understand motivation and underachievement and broadly determined that gifted students who attended specialized secondary schools had developed a strong sense of academic competence and efficacy. This pattern, however, was not consistent for students who attended comprehensive secondary schools that lacked specialization in gifted education. Neither the Miazrahi (2018) study or Almukhambetova and Hernández (2020) study investigated or described secondary programs and programming designed and implemented to maximize gifted students' agency, curiosity, and confidence and self-determination. Kettler (2016) states:

> We need well-designed case studies with transparent methodologies and valid analytics to study the process of talent development in young people. What types of learning experiences are helpful at building a romance or love for a discipline? Which environments or communities of learning support and sustain uncommon commitment and long-term motivation? How can we design learning experiences that will help students identify areas of intense interest that may inform postsecondary education and career choices (p. 18)?

Summary

Definitions of giftedness and gifted and talented have evolved to include several domains of giftedness in which students can be identified. These definitions have broadened in scope to include mentions of nurturing and developing gifted learners and providing programming opportunities and supports to do so. High school programming for gifted learners is dominated by AP and IB coursework, neither of which is designed for gifted learners. Mentorship and academic competition can enrich the gifted learner's high school experience, but not as much as a true and committed implementation of a

model like Schoolwide Enrichment Model or the dimensions of the Autonomous Learner Model, both of which were specifically designed for gifted learners. Modern contexts of learning are shifting due to globalization and developments in connected technologies that supply learners with constant streams of information.

The nuanced and complex needs of gifted and talented high school learners, reflected in the evolving definitions of giftedness, are not sufficiently met by traditional course and program offerings like AP and IB. For students to maximize the autonomy, competence, and relatedness tenets of Self-Determination Theory through a conceptual model of agency, curiosity, and confidence, gifted and talented high school students must be afforded opportunities for agile and dynamic learning that is honoring of and responsive to their individual and collective needs and interests. This study described and explored high school gifted programming and learning environments that exist to do just this by maximizing students' agency, curiosity, and confidence.

CHAPTER THREE: METHODS

Creswell (2013) states that case study research is a methodology used to develop in-depth understanding of a single case or of multiple cases. It is a familiar methodology to the fields of medicine, psychology, law, political science, and, now, education. Yin (2018) defines case study research as "an empirical method that investigates a contemporary phenomenon in depth and within its real-world context" (p. 15). Case studies ask *how* and *why* questions as they investigate bounded entities such as individuals, programs, groups, and organizations. While Creswell (2013) indicates case study research is qualitative, Yin (2009) maintains that such research can be both qualitative and quantitative as its design employs various methods of data collection and analysis to arrive at its intended, deep, and rich results designed to explain, explore, and/or describe the case or cases studied. A case study methodology was chosen for this study to describe learning environments and determine how and why the environments promote and maximize gifted students' agency, curiosity, and confidence. Challenging programming options for gifted and talented high school students are typically dominated by Advanced Placement (AP) and International Baccalaureate (IB) courses (Hertberg-Davis & Callahan, 2008). These AP and IB programming options tend towards methods of acceleration rather than differentiation and other features and strategies of gifted education (Heacox & Cash, 2014; Hertberg-Davis & Callahan, 2014; Kettler & Puryear, 2016; Plucker & Peters, 2017). Advances in technology and networking are affording

educators and students more opportunities for personalized and inquiry-driven curricular designs and pedagogy (Kanevsky, 2017; WCGTC, 2019). These personalized and inquiry-driven opportunities promote student agency and can increase motivation and commitment by honoring students' curiosities and interests (Plucker & Peters, 2017; Richardson, 2019). Gifted education, which includes acceleration, aims to create rich and complex learning experiences that are appropriate to students' domains of giftedness. Given the general systemic needs of high schools, implementing such complex learning environments may require significant levels of support from students, teachers, counselors, and administrators. High schools that have such programs in place and are working towards sustainability and potential expansion deserve to be studied for common characteristics and themes. Descriptive case study is an appropriate choice when the research aims to identify characteristics and trends (Creswell & Creswell, 2018).

Research Methods

To contribute to the collective understanding and body of knowledge regarding sustainable secondary gifted education, this study was designed as a descriptive multisite (collective) case study. The purpose of this study was to explore high school learning environments designed to maximize the agency, confidence, and curiosity of gifted and talented and twice-exceptional students. "The intent of qualitative research questions is to narrow the purpose to several questions that will be addressed in the study" (Creswell, 2013). In doing so, this study addresses the following research questions:

1. How does the learning environment nurture the agency of gifted and talented secondary students?
2. How does the learning environment nurture the curiosity of gifted and talented

secondary students?

3. How does the learning environment nurture the confidence of gifted and talented secondary students?

To address these research questions, data was collected through a survey questionnaire, interviews, observations, and the collection of documents and artifacts from teachers, counselors, and school administrators. Findings will inform and inspire efforts to improve high school programming for gifted and talented students by describing specific examples of programs and schools that can be studied, adapted, and scaled. The conceptual model of student agency, as described by self-determination theory, and themes and patterns informed the analysis of collected data.

Descriptive Case Study

Case study is an appropriate method when asking *why* and *how* questions, when the researcher has no control over the behavior of the participants, and when the study investigates contemporary issues in depth (Yin, 2018, p. 9). The definition of the cases in this study is teachers and administrators who, according to their reputations and connections within the field of gifted education, websites, and marketing are working to implement and lead learning environments designed to maximize gifted students' agency, confidence, and curiosity.

Hamilton & Corbett-Whittier (2013) and Yin (2018) define a descriptive case study as study of the context of a case and how such context has occurred and is occurring. This differs design from exploratory and explanatory case studies. Exploratory case studies aim to create questions for further study and explanatory case studies often have the goal of explaining how a case or situation arose. A descriptive study, like this

one, is a study focused on detail and depth – committed to making the unfamiliar familiar to others.

Role and Positionality of the Researcher

Researchers must reflect on their own interpretation based on their backgrounds and experiences – both culturally and professionally (Creswell, 2013; Creswell & Creswell, 2018). I am a mixed white and Hispanic, middle-class male. I have experience teaching all levels K-12, but, have taught high school science, including Advanced Placement, Honors, and International Baccalaureate courses, since 2000. I have worked in three different public schools in two states with supplemental experience working for private and independent schools. These schools have been high socio-economic schools and low socio-economic schools with varying levels of diverse demographics. I have also worked as a high school administrator and gifted education coordinator and as a central district instructional technology coordinator.

As a teacher and administrator, I have opened a new school and created and implemented a school-within-a-school model, which is a focused and autonomous learning environment that contributes to both its own internal mission and values and also to the mission and values of the larger school system in which it exists. I have worked in alternative and experiential models of education as well as traditional models that include accelerated Advanced Placement and International Baccalaureate programming. In 2012, I was afforded the opportunity to open a program within a high school that was individualized and differentiated to students' interests and passions. This program was interdisciplinary, project-driven, democratic learning environment designed to involve students in all aspects of the program's purpose and operations.

All of these experiences have transformed me into an educator and a leader focused on the creation and implementation of learning environments that nurture students towards a lifelong love of learning. Much of this work incorporates the technological affordances of modern society and our trends towards globalization and networking in an information-rich environment. These trends provide learners, especially gifted learners, opportunities to contribute to inter and transdisciplinary problems and their potential solutions. My diverse experience as an educator affords me a knowledge-base and appreciation for various forms of programming options for gifted learners. I have experience coaching and evaluating new and veteran teachers, which includes the skills required to observe learning environments, interview teachers, administrators, and counselors, and a discerning ability to find and collect functional documents specific to curriculum, instruction, and assessment. All of this experience and these skills proved essential to conducting this study. The logistics of connecting and communicating with teachers, administrators, and counselors and of planning and executing detailed visits to the participating sites were manageable, though certainly not without challenges. Effective interaction and interviewing require building and establishing rapport with participants (Best & Kahn, 2006). My experience in education was essential to creating a trust and comfort with the teachers, counselors, and administrators who participated in this study.

Settings

Settings in this study are not limited to public or to independent (private) schools. Appropriate sites are those that have initiated programs, programming options, and service delivery options that are specific to the needs of gifted learners. Through their

offerings, these sites have created learning environments designed to maximize the agency, curiosity, and confidence of gifted learners. Purposeful sampling according to the criteria in Table 3.1 has led to several sites with the potential to study.

Table 3.1
Criteria and Rationale for Study Site Selection

Criteria	Rationale
Programming/service delivery opportunities (courses, grouping of students, clubs, extracurricular offerings) are specific to the perceived and/or measured needs of gifted and talented (GT) students	Beyond accelerated content, a curriculum (programming/service delivery) designed and facilitated specifically for GT students will utilize best practices of gifted education, which may include concepts-based instruction and inductive pedagogy (Erickson & Lanning, 2014; Sousa, 2009).
Programming/service delivery that affords GT students opportunities to frame, conduct, and report/present original research centered around students' driving questions	Such opportunity is highly autonomous (as described by SDT) and is designed to maximize student agency, curiosity, and confidence (Berger, 2014; Richardson, 2015).
Inter/transdisciplinary programming/service delivery options	This programming/service delivery is appropriately deep and complex for GT learners. It synthesizes content and disciplines to allow for the investigation of modern societal and global problems (Ambrose, 2016; Kettler, 2016).
Online or blended programming/service delivery options for GT students	Virtual options, like online and blended learning, transcend traditionally scheduled courses and thereby afford GT students the opportunities to extend the depth of their learning while at a potentially accelerated pace (Freeman et al., 2017; Sanguras, 2016).
School and community leadership and democratic participation and opportunities for GT students	Democratic schools provide GT students opportunities to invest in their school and community – to work on complex and timely problems that directly impact their

	schools and their fellow students and their teachers (Dintersmith, 2018; Meier & Gasoi, 2017; Socol, Moran, & Ratliff, 2018).

Three settings were identified as potential candidates. They were found by recommendation or by their reputations within the field of gifted education through conference presentations and school and program websites. They were deemed appropriate for this study after comparing the details of their public descriptions and program/school details to the criteria in Table 3.1. One setting is a STEM and biotechnology-focused public high school that has developed robust programming for its gifted and talented (GT) students that includes concurrent and dual enrollment, Advanced Placement courses, and academic competitions. The school has a clustered Advisement program and interdisciplinary course offerings for its GT learners. A second setting is a traditional public high school that has implemented an Honors/Gifted academy as a school within its school. The Honors/Gifted academy weaves into the comprehensive high school's graduation requirements and adds an interest-driven research process to each student's programming. Students in this academy are cluster grouped by Advisements and work closely with their teachers to develop their projects. Participation in the academy is voluntary for both students and teachers. A third site is a private network of schools designed for twice-exceptional learners that leverages the capacity to design courses and curriculum around students' interests and needs – in addition to offering more traditional coursework. All of these three options include some degree of virtual and blended online integration to amplify instruction and their students' abilities to share their learning endeavors.

A fourth site was also considered for participation. It is a district-led program that allows advanced and motivated students from any of the district's high schools to join. Located centrally and in the heart of the community's business district, students' partner with teachers and community and business members to apply their learning via projects that have immediate public impact. Though not selected as a participating site, this district program will be discussed further as a model to consider for further research and consideration.

Together, the three high school sites represent the multiple cases in this research study. Table 3.2 summarizes and describes aspects of the three sites. They each, in their own unique ways, serve to increase students' ownership of their learning by maximizing agency, curiosity, and confidence.

Table 3.2
Site Descriptions

Name of School [a]	Type of School	Selection Criteria	Number of students
Capstone	Public (9-12)	Four-year GT program interdisciplinary, research projects, grouped advisory	1700
Global	Public (9-12)	Interdisciplinary, research projects, dual (concurrent) enrollment, biotechnology & STEM, clustered Advisements	2200
Personalized	Private (9-12) (network of schools)	GT & twice-exceptional, personalized learning, virtual/online, 6:1 student to faculty ratio, research project	300

[a] Pseudonyms were assigned to each school

Participants

Participants from each site included two teachers, an administrator or leader, and one person serving in the role of counselor or mental health or social-emotional support. By including administration, the research extended into the vision and leadership of the learning environments, which helped describe the cases' origin and sustainability. Teachers and their classrooms provided the lenses to student engagement and empowerment as it exists in the day-to-day practices in the learning environments. Counselors and mental health support staff added dimensionality and aspects of social-emotional learning that are important to the rationales behind the sites and their reasons for existing. In sites with more than two teachers in the program being studied, the participating administrator was asked to recommend teachers according to the following criteria adapted from Ryan and Deci's (2017) "Teacher behaviors shown empirically to be autonomy-supportive" and Bryant's (2019) "Notions of student agency."

- Excellent at listening to students
- Give students opportunities to talk
- Encourage students' efforts
- Acknowledge students' experiences and perspectives
- Responsive to students' contributions
- Considered motivational by students and colleagues
- Design learning opportunities that apply knowledge and experiences
- Act creatively and assertively (Ryan & Deci, 2017; Bryant, 2019)

Data Collection

According to Creswell (2013) the "hallmark of a good case study is an in-depth understanding of the case … the researcher collects many forms of data." This data includes interviews, observations, participant-observations, documentation and relevant artifacts (Yin, 2018). Data in this study was collected over a period of two months and included the use of questionnaire surveys, participant interviews, observations, and school/program curricular documents and learning artifacts. The survey collected data regarding participants' demographics, and backgrounds and experience specific to gifted education. Interviews asked open-ended questions addressed at the *why* and *how* study research questions. The interviews subscribed to a structure of a guided conversation (Yin, 2018). All four participants from each site participated in a second interview, which focused on topics of modern learning, globalization, and 21st century competencies in education and on how their learning environment, through its purposeful design, is maximizing student agency and exposing students to these topics.

Survey/Questionnaire

Participants initially completed a survey questionnaire designed to gather demographic information, perceptions of giftedness, and experience with gifted education. The survey was self-administered and composed of closed questions (Fowler, 2014). It was the first source of data collected in this study and was applicable to descriptive statistical analysis. Questions on this survey questionnaire regarding perceptions of giftedness were modified from Urlik's (2017) Survey of Knowledge and Attitudes on Gifted Programming. The survey questionnaire used in this study was designed and written for teachers, counselors, and administrators, though several of the

questions were specific to the administrator participants. The survey contained 16 questions. Table 3.3 details each question, its rationale, and its format.

Table 3.3
Survey/Questionnaire Questions, Rationale, and Format

Question	Rationale for Question	Question Format	Citation(s)
1. How long have you been an educator?	Collect general information about the educator to determine possible trends or relationships	Closed response, select one response	Demographics
2. How long have you been an educator at your current school?	Collect general information about the educator to determine possible trends or relationships	Closed response, select one response	Demographics
3. What school/program did you attend for your teacher preparation program?	Collect general information about the educator to determine possible trends or relationships	Text entry response	Demographics
4. What is your highest degree earned?	Collect general information about the educator to determine possible trends or relationships	Closed response, select one response	Demographics
5. Which best describes your current role at your school?	Collect general information about the educator to determine possible trends or relationships	Closed response, select one response	Demographics
6. How long have you been in the role you indicated in the previous question?	Collect general information about the educator to determine possible trends or relationships	Closed response, select one response	Demographics
7. If you are an administrator, how long did you teach prior to becoming an administrator?	Collect general information about the educator to determine possible trends or relationships	Closed response, select one response	Demographics

8. If you are an administrator, what school/program did you attend for your principal preparation program?	Collect general information about the educator to determine possible trends or relationships	Text entry response	Demographics
9. What is the total population of students in your school?	Collect general information about the school to determine possible trends or relationships	Closed response, select one response	Demographics
10. What is the percentage of identified Gifted and Talented students at your school?	Collect general information about the school to determine possible trends or relationships	Closed response, select one response	Demographics
11. How many full-time certified employees are at your school who are a GT teacher, GT Coordinator, or GT Specialist?	Collect general information about the school to determine possible trends or relationships	Closed response, select one response	Demographics
12. How many part-time certified employees are at your school who are a GT teacher, GT Coordinator, or GT Specialist?	Collect general information about the school to determine possible trends or relationships	Closed response, select one response	Demographics
13. What do you feel are the greatest benefits to having a strong GT program within a school?	Collect information about the educator's knowledge-base to determine possible trends or themes	Text entry response	Reis, 2006; Plucker & Peters, 2017
14. Rate your personal knowledge around the needs of GT students.	Collect information about the educator's knowledge-base to determine possible trends or themes	Rank order	Reis, 2006; NAGC, 2010; Hertberg-Davis & Callahan, 2013
15. Rank order the topics based on your level of personal knowledge, with (1)	Collect information about the educator's knowledge-base to determine possible trends or themes	Rank order	Reis, 2006; NAGC, 2010; Hertberg-Davis &

being the topic you are most knowledgeable about			Callahan, 2013; CDE, 2016
16. In what ways have you acquired knowledge about GT learners?	Collect information about the educator's knowledge-base to determine possible trends or themes regarding how the educator does or does not acquire knowledge of GT learners	Closed response, select one response	Delisle, 2014

Interviews

"One of the most important sources of case study evidence is the interview" (Yin, 2018). Interviews provide insight into participants' perceptions specific to the study's research questions. Case study interviews should resemble guided conversation more than formally structured question and answers (Hamilton & Corbett-Whittier, 2013; Yin, 2018). The interviews in this study provided valuable feedback and insight regarding the work and drive of educators involved in each site. There were two interviews per participant. The first interview focused on all three research questions specific to the current state of the learning environment. It began with a question regarding the participant's background and desire to work in the program/school before asking questions specific to student agency, curiosity, and confidence. The second interview also focused on the three research questions, but did so from a desired state lens, which asked participants to think through and past the current state of the learning environment and into realms of desired growth and future iteration. Both interviews took approximately 30-60 minutes each to complete. Table 3.4 details each interview question and its rationale.

Table 3.4
Interview Questions and Rationale

Question	Rationale for question	Citation(s)
First Interview: Current State		
Please tell me a bit about your background. How did you arrive in education? Where did you begin your career?	This question is an introductory question to build rapport with participants and to gain knowledge about participants' general backgrounds.	Demographics
How did you get involved in this program/school?	This question is an introductory question to build rapport with participants and to gain knowledge about participants' general backgrounds – especially pertaining to their backgrounds and introductions to gifted education.	Reis, 2006; NAGC, 2010
How do you get to know your GT students?	This question asks about an educator's methods of learning about his/her students, which is vital to any attempts to maximize agency, curiosity, and confidence.	Bryant, 2019; Ryan & Deci, 2017
Please describe how this program/school nurtures and respects GT students' power, choice, and voice (especially as compared to any other programs and schools in which you've worked).	This question is about student agency (research question #1) and how students are empowered to own their learning through the design and facilitation of the program/school. It makes purposeful comparison to any of the educator's prior experience.	Bjerede, 2018; Bryant, 2019; Ryan & Deci, 2000; Ryan & Deci, 2017
How are GT students able to manifest their curiosity in the form of asking their questions? (How are they given opportunities to seek and share answers to their original questions? How are students afforded time	This question is specific to how purposefully the educator and the program/school encourages and nurtures students' questioning and what they do with their questions (beyond the asking of clarifying and closed questions).	Berger, 2014; Ryan & Deci, 2017

to dive deeply into an idea or topic?)		
How are you able to gauge and tend to GT students' levels of confidence in themselves and in their learning?	This question is in regard to educators understanding and perceptions of their students' confidence in themselves and in their abilities.	Richardson, 2015; Ryan & Deci, 2000; Ryan & Deci, 2017
What are some of the challenges of working in your program/school?	This question shifts to the educator's perspective to share (and reveal) his/her narrative of what it is like to teach/lead/counsel in a program designed to maximize agency, curiosity, and creativity.	Mehta & Fine, 2019; Richardson, 2015
Who or what areas of the learning environment do you recommend I observe? Which areas should I observe? Why?	This question transitions to observations of the learning environments and gives the participant the opportunity to suggest areas to observe and thus additional data to collect.	Mehta & Fine, 2019
Is there a question I didn't ask that you wish I had asked?	This signals the end of the interview and provides the participant an opportunity to elaborate on a previous answer or to introduce related information that wasn't directly asked about in this interview.	
Second Interview: Desired State		
What are some of your most memorable moments from your days as a student? (At any level of education)	This question is an introductory question to build rapport with participants and to gain knowledge about participants' general backgrounds.	Demographics
What reason(s) do GT students often cite regarding why they joined your learning environment and why they stay?	Students and families chose the program/school because they were afforded the opportunity to do so. Knowing why they made this choice	Bjerede, 2018; Bryant, 2019; Ryan & Deci, 2000;

	is reflective of both the reputation and promise of the program/school.	Ryan & Deci, 2017
What can you point to (or describe) as some of the most promising aspect of your program/school - something in which you think students will continue to excel and contribute moving forward?	This question asks participants to contemplate the momentum of the program/school towards their desired state. It asks them to identify any potential main objectives of their work towards maximizing GT students' agency, curiosity, and confidence.	Mehta & Fine, 2019; Richardson, 2015
By exercising more agency than in more traditional settings, what do you think your GT students are experiencing that will truly benefit them in the future?	This question asks participants to consider the deeper purposes behind a focus on student agency (voice, choice, and power).	Bjerede, 2018; Bryant, 2019; Mehta & Fine, 2019; Richardson, 2015 Ryan & Deci, 2000; Ryan & Deci, 2017
How do your students utilize technology to connect with others outside of the learning environment? How do they share their learning with their community and those in other parts of the county, state, country, and/or world?	Modern learning environments leverage connected technology to amplify student learning and to extend beyond the confines of the school/program. Students are afforded the opportunity to network with expertise and their communities.	Ambrose, 2016; Berger, 2014; Freeman, et al., 2017 Mehta & Fine, 2019; Richardson, 2015; Sanguras, 2016
How does teaching (leading or counseling) in this program/school maximize your agency, curiosity, and confidence?	This question shifts to the educator's perspective to share (and reveal) his/her narrative of what it is like to teach/lead/counsel in a program designed to maximize agency, curiosity, and creativity.	Mehta & Fine, 2019; Ryan & Deci, 2017
Is there anything else you would like to share?	This signals the end of the interview and provides the participant an	

	opportunity to elaborate on a previous answer or to introduce related information that wasn't directly asked about in this interview.	

Observations

Observations of classroom interactions, teacher-teacher and teacher-administrator were conducted to add to the depth of understanding regarding the case of study. The observations followed a protocol/instrument that included the elements described by Uhrmacher, McConnell Moroye, & Flinders (2017): wide-angle lens, multi-sensory approach, episodic vignette, and lens-specific observation (Appendix E). The goal of each observation was to note and capture various aspects of the learning environments when students were present and also the work that takes place amongst the teachers, administrators, and counselors when students were not present.

A schedule of observations was created for each visitation at each participating site. They included time spent observing each participant. Administrators were observed and shadowed during the first visit for a period of an hour each. Each teacher participant was observed during at least one of their class periods with GT students. Each counselor participant was observed and shadowed for an hour during the second visit to each site. Observation times with counselors included meetings with students consistent with their respective schedules. Table 3.5 organizes this information and includes time reserved to observe the overall learning environment (site-wide). Though the actual times of observation varied by site, they were held consistent at each site for each of the site's two visitations.

Table 3.5
Observation Schedule and Durations for Site Visits

Visit #1	
Administrator	One hour
Teachers (2)	One class period per teacher, minimum [a]
Site-wide	Variable [b]
Visit #2	
Counselor	One hour
Teachers (2)	One class period per teacher, minimum [a]
Site-wide	Variable [b]

[a] Often extended into portions of following class periods.

[b] Included time between classes, during lunches, and before and after school.

Time spent in observation was recorded and described by handwriting notes into a field notebook. The wide-angle lens approach provided context that related observations to the overall dynamics of the environment. It included taking pictures to record the design and physical layout of the learning environments. The multi-sensory approach helped create an immersive observation beyond what was seen. Side conversations and the coming and going of other educators and students were noted as a result of this approach. Episodic vignette sought and then described interactions amongst the educators and students in the learning environments. Several of these vignettes are included in the discussion of the study's findings and summary. A lens-specific focus noted dynamics that included students demonstrating aspects of agency, curiosity, and confidence. This

was most often noted by adding highlights and symbols to observational notes in accordance with the characteristics associated with each concept (or lens).

Documents and artifacts

Documents and artifacts are stable, specific, and insightful forms of data and evidence to improve the validity and effectiveness of a case study (Yin, 2018). This study collected curriculum documents, marketing documents, administrative documents, community and news articles, notes, and calendars as documents that were reviewed and analyzed. Collected artifacts supported the classroom observations. Both documents and artifacts were used cautiously to minimize bias by being overly selective in nature and thereby misrepresentative of the overall learning environments being studied.

Data Analysis

Creating and utilizing a detailed data analysis strategy is essential to distinguish a research case study from a non-research case study. Yin (2018) suggests playing with the data and evidence seeking patterns and themes. This can be accomplished by creating visual displays of the data, creating tables, and arranging information and events in chronological order. The collected data was organized by site and then by participant. Observational notes and curricular and program/school documents were read and annotated with margin notes adding details, highlights, and reflective thoughts. Each interview recording was listened to and subsequently transcribed. The transcribed interviews were, in a procedure identical to that used with observational notes and document analysis, read and annotated. This initial process was used to get a sense of the whole as recommended by Creswell & Creswell (2018) in reference to Tesch (1990) who

organized a series of steps to data analysis and inductive coding. The information provided by Creswell & Creswell and Tesch was applied as follows:

1. Get a sense of the whole by reading transcriptions, notes, and documents carefully. Annotate with ideas and thoughts.
2. Choose one transcription, note, or document and re-read carefully asking, "What is this about?" Annotate further with thoughts and ideas.
3. Continue the process described in #2 for all participants and compile a list of topics and ideas. Cluster similar topics then condense and abbreviate them.
4. Review documents, notes, and transcriptions and annotate with the abbreviated and condensed topics/codes.
5. Rewrite each topic/code with more descriptive wording.
6. Visualize and group topics/codes into themes representing common ideas.

The emergent themes were then reviewed and analyzed deductively using the concepts of the student agency, curiosity, and confidence as applied from Self-Determination Theory to identify which of these described concepts were most consistent with each theme. Participants' responses to interview questions, that were aligned with the study's research questions, were further reviewed during this process. During this portion of the analysis, summary documents containing quotes from participants organized by the concepts of student agency, curiosity, and confidence were created. These documents were shared with each respective participant who was invited to review and respond to their quotes and contributions with any addition thoughts or responses. Reviewing these returned documents from participants provided additional context

regarding their ideas and work to maximize the agency, curiosity, and confidence of their gifted students.

"Using and analyzing multiple sources of data relates to the basic motive for doing a case study" (Yin, 2018). Triangulation of data in this study was ensured by collecting multiple sources of data and information. The collective data was used to develop a detailed analysis of the cases (Creswell, 2013) to describe the context of the multiple sites studied in this case study (Creswell & Creswell, 2018). Observation notes, interview transcripts, and documents and artifacts were organized and studied according to their intended purposes, the emergent themes, and the conceptual framework of student agency, curiosity, and confidence.

Ethical Considerations

Beyond obtaining approval from the University of Denver Institutional Review Board (DU-IRB) and participating districts and schools research approval boards, additional care was taken to obtain informed consent of the teacher, counselor, and administrator participants prior to survey, interview, and observation of their practices through the process of data collection (Appendix A). Participant and school identities are secured by the use of pseudonyms. All data and transcribed interviews were stored on secure University servers and disposed of upon completion of the study. Interview transcripts were shared with participants to ensure accuracy and to solicit additional feedback and input. The results from this study were shared with participants to demonstrate transparency and a spirit of academic progress and best practices.

CHAPTER FOUR: RESEARCH AND FINDINGS

The purpose of this study was to explore high school learning environments designed to maximize the agency, confidence, and curiosity of gifted and talented and twice-exceptional students. Four participants at three different high schools were studied to describe their efforts on behalf of gifted learners. Participants included teachers, counselors, and administrators who each completed a written survey and participated in two semi-structured interviews over the course of a two-month period. Survey and interview data have been analyzed in conjunction with documents and artifacts to address the study's three research questions.

1. How does the learning environment nurture the agency of gifted and talented secondary students?
2. How does the learning environment nurture the curiosity of gifted and talented secondary students?
3. How does the learning environment nurture the confidence of gifted and talented secondary students?

This chapter begins with an introduction to the participant and their respective sites and then proceeds to provide detailed portraits of their learning environments and data collected. Observations and data from all three school sites is overlapped and synthesized for commonality in practice. The analyzed data is addressed according to each research question and to the conceptual framework of student agency, confidence,

and curiosity. A discussion of emergent and overarching themes follows and leads into a conclusion of the study's findings.

Context of Study

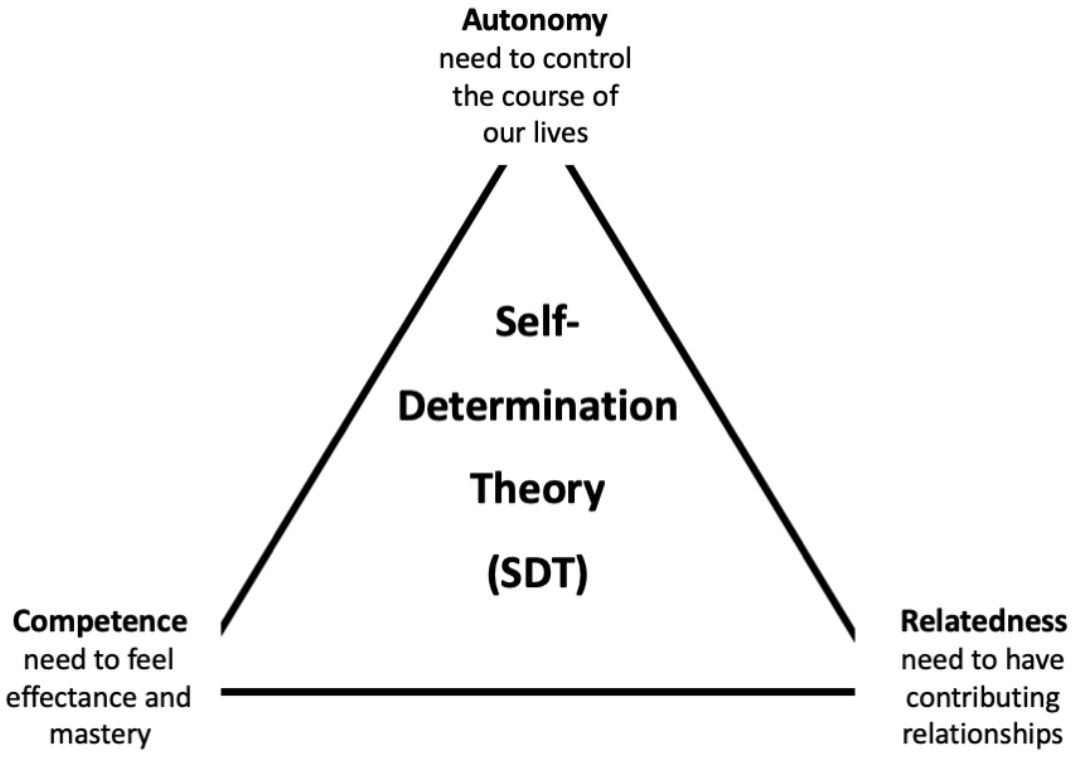
Designed as a descriptive case study, the methods of this study provide an in-depth understanding of student agency, curiosity, and confidence as practically implemented in a real-world context at several sites - high schools in this instance. The high schools in this study provide programming options that extend learners' experiences beyond accelerated coursework like Advanced Placement (AP) and International Baccalaureate (IB). These programming options include research projects and personalized curriculum offered through individual courses, a program consisting of vertically aligned series of courses run in conjunction with more traditional coursework, and through an entire school structure of personalized coursework and learning activity.

The persistent problem of practice of this study is rooted in the assertion that the nuanced and complex needs of gifted and talented high school students are not sufficiently met by traditionally and more commonly offered course work like AP and IB. This assertion is emboldened by increasingly connected and networked global societies – and by the access to information, expertise, and critique offered by the modern world. Schools and programs that exist to nurture and maximize the potential of gifted learners by capitalizing on aspects of modern learning are worthy of description and study.

This study deploys a conceptual framework consisting of student agency, curiosity, and confidence. While the three concepts are related as personalized constructs of learning, they are rooted within Deci and Ryan's Self-Determination Theory (SDT) of

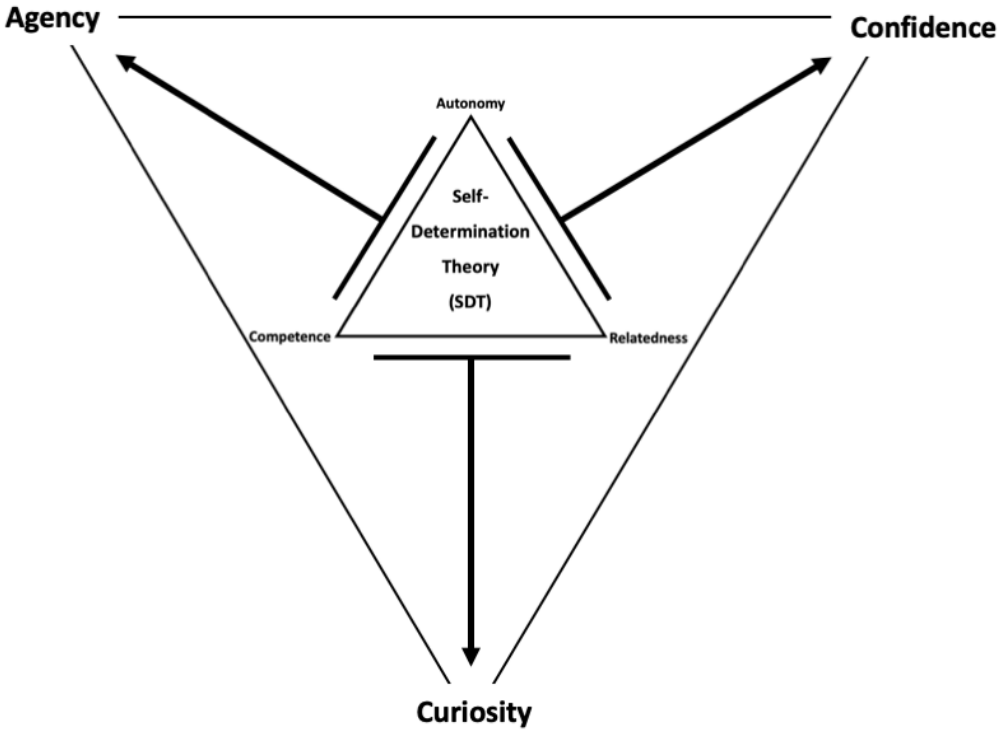
motivation. SDT is built on the basic human needs for autonomy, competence, and relatedness (Ryan & Deci, 2017; Ryan & Deci, 2000) and is visualized in Figure 4.1.

Figure 4.1
The Basic Tenets of Self-Determination Theory (SDT)



Student agency is built on autonomy and competence, as exercised voice, choice, and power over their learning (Bryant, 2019). Curiosity, fundamental to an inquiry-based and personalized approach to learning, is a product of competence and relatedness. Student confidence is conceptualized as a synthesis of SDT's tenets of competence and relatedness. Figure 4.2 depicts these relationships as a conceptual framework built on Self-Determination Theory.

Figure 4.2
Conceptual Model of Agency Built on SDT



Framed and supported by the tenets of the Self-Determination Theory (SDT), this study collected data and interviewed educators working in high school learning environments designed to maximize the agency, curiosity, and confidence of gifted learners. These educators shared the goals, expertise, and passion that underlies their efforts to nurture students' autonomy, competence, and relatedness via a conceptual model of agency, curiosity, and confidence.

Sites and Participants

The three high schools included in this study are located in the United States. Each school was discovered as a result of searches based on select criteria consistent with the concepts of student agency, curiosity, and confidence as rooted in SDT. The selected sites have presented at local, state, and national gifted education conferences and maintain active digital and marketing presences. Their efforts to share their work helped identify them as potential candidates for study. Reviews of their public websites and documents determined that they met the criteria for site selection. The following list summarizes the key criteria used in selecting sites and participants for this study.

Sites that offer:

- Various and diverse programming opportunities
- Original research opportunities
- Learning opportunities across several subjects and content areas
- Online, digital, or blended options
- School and community collaboration

Participants who (are):

- Excellent at listening to students
- Encourage students' efforts
- Acknowledge students' experiences and perspectives
- Responsive to students' contributions
- Considered motivational by students and colleagues
- Design learning opportunities that apply knowledge and experiences
- Act creatively and assertively (Ryan & Deci, 2017; Bryant, 2019)

To investigate and best describe the work of each school, participants working in positions of administration, counseling, and teaching were selected. Table 4.1 lists the schools and participants involved in this study.

Table 4.1
Study Participants' Schools and Positions

School [a]	Participant [b]	Position
Capstone High School	Morgan Purce	Administrator
	Kristen Harris	Counselor
	David Bellore	Teacher
	Lynn Mewis	Teacher
Global High School	Scott Wise	Administrator
	Aaron Lorry	Counselor
	Ken Dickson	Teacher
	Matt Fonseca	Teacher
Personalized High School	James Reed	Administrator
	Rocio Moran	Counselor
	Emilia Krieger	Teacher
	Russell Clark	Teacher

[a] Pseudonyms were assigned to each school. [b] Pseudonyms were assigned to each participant.

Quotes from interviews of selected participants and vignettes specific to each site introduce each of the following sections. The quotes relate design and implementation aspects regarding the goals of the learning environments. The vignettes depict interactions in each respective learning environment prior to a more detailed description

of the site and learning environments themselves and the input and data gathered from each of the site's four participants. The sections also include images taken of various aspects of the learning environment. These images are of student and educator activity and of physical aspects of the learning environment. They supplement and add to the interview and observational data and research findings.

Capstone High School

"We create the capacity for our students to explore complex and relevant issues."

(Morgan Purce, Capstone High School)

Genghis Khan sat at the front of the class with his back to the whiteboard that ran the length of the wall, facing an audience of freshmen gifted and talented students sitting in three sections of the room. Each of the three sections consisted of ten or so single student desks haphazardly pushed together in clumps. One of the sections, the exception, consisted of two neat rows of student desks. Genghis sat defiantly, with both arms folded across his chest glaring at the students across from him. Over Genghis' right shoulder was a television screen angled towards Genghis and to the group of students. The screen awoke suddenly and changed from a black screen to an image of a young student holding an open laptop. The student on the screen, who I soon discovered was located in a different state more than a time zone away, began to question Genghis regarding "alleged" war crimes and atrocities. Genghis, unfazed by the distant prosecutor, answered the questions he was asked - occasionally adding flair to provoke those in the room with him.

This is how the trial of Genghis Khan, role-played by a Capstone High School freshman in collaboration with students at a high school further east in the United States,

proceeded - in a typical prosecution/defense/jury fashion until judgement was pronounced (guilty) and a sentence delivered (jokingly, a year of school trash cleanup meant to simulate prison with hard labor). The activity, I was later told, was initiated by students' curiosity and angst regarding several current events involving multiple modern countries. The group of GT students enacting the courtroom drama are members of the school's freshmen clustered advisory program.

About Capstone High School

"It's not about doing more, it's about going further."

(Dr. David Bellore, Capstone High School)

Capstone High School is a public high school the serves close to two thousand students. Their programming is comprehensive and includes extensive course offerings in subjects like English, Science, Social Studies, Mathematics, World Languages, Business, Physical Education, and Fine, Visual, and Performing Arts. These courses include core and elective-type courses. Capstone High offer Advanced Placement (AP) courses. They maintain an extensive selection of extracurricular options that include clubs, academic competitions like Science Olympiad, Debate, and many sports.

Specific to this study is Capstone's Gifted and Talented (GT) program, which includes a Freshman weekly seminar class and then a GT and Honors Academy that students may choose to participate in starting their sophomore year and through their senior year. Students who progress through Capstone's GT/Honors Academy receive a specialized diploma that indicates their successfully completion of the GT/Honors Academy capstone project.

> At Capstone High there is a change in focus towards our population of GT Identified students. Historically, this population of students has had few specific programs, trained professionals supporting them, and limited funding. We offer programming to meet the needs of our GT students. (Capstone, 2018)

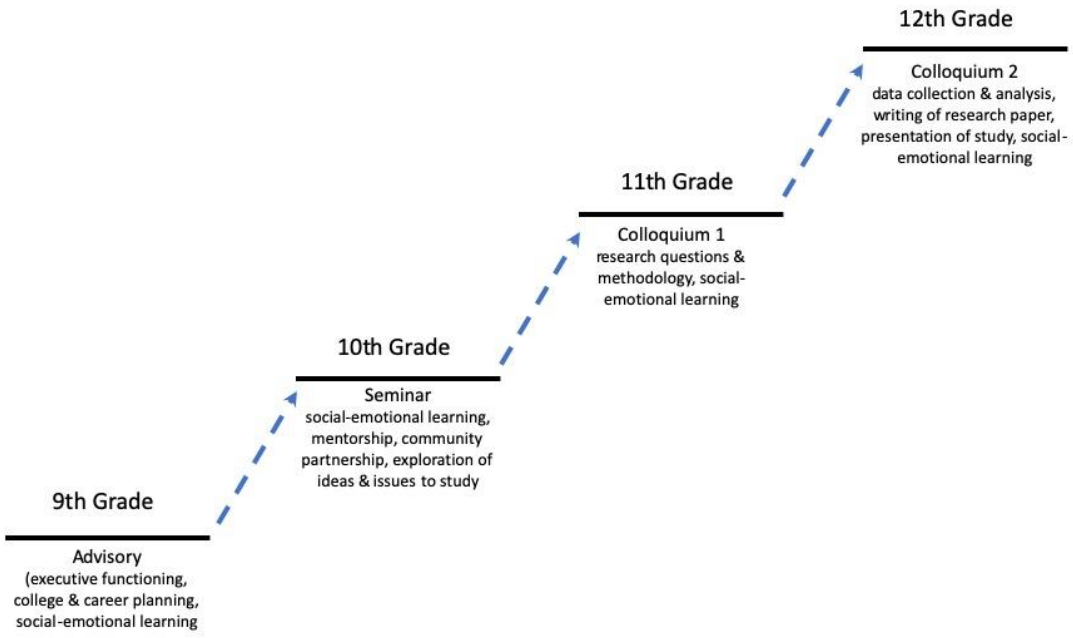
Lynn Mewis, a teacher-participant in this study, founded Capstone's vertically aligned GT program, which she created as her master's degree thesis and then proposed to the Capstone principal for eventual implementation. Her idea, put simply, was for a homogeneously grouped GT Freshman Advisory class designed to introduce students to techniques of questioning, Socratic seminar, career and college readiness, executive functioning skills and strategies, and social-emotional learning activities. A critical component of Mewis' proposal was for a full-time counselor, educated in gifted education and counseling, to exclusively serve Capstone's GT students and to work side-by-side with Lynn serving the various academic and social-emotional needs of their GT population. The vertically aligned program then progressed into a sophomore "Seminar" course, which is optional for Capstone's GT students. Participation in the sophomore Seminar class indicates a desire and commitment on the parts of the GT students to continue through to their senior years.

The sophomore Seminar curriculum includes opportunities to select and investigate critical contemporary and global issues. Students gain exposure to working with their peers in high-functioning and performing groups. They learn to understand the dynamics of group work based on areas of strength and contribution and they learn techniques of working effectively in groups via their individual efforts. To achieve this, Mewis and her colleagues organize visits from organizations that specialize in such work. By the end of their sophomore year, the students who are participating in the Seminar

course - which is then officially considered the first year of the GT/Honors Academy - are expected to have identified an area of deep interest to research their junior and senior years. Additionally, each student is matched with a community partner.

The junior and senior years of the GT/Honors Academy are called Colloquium. Junior and Senior Colloquium classes are discussion-oriented seminars that feature scholarly examination of the ideas identified during the sophomore Seminar class. Specifically, these classes exist to "examine the significant ideas from varying disciplines pertinent to the human story" (Capstone, 2019). The Junior Colloquium class focuses on identifying an opportunity or problem of practice and developing research questions and methodology. The Senior Colloquium is focuses on collecting and analyzing data, summarizing results and findings, and presentation of the study and its significance. Each of these courses is taught by instructors with extensive research experience with the demonstrated ability to guide students from question to results to presentation. The Colloquium instructors advance with their students from junior to senior year before receiving a new cohort or class of Junior Colloquium students.

Figure 4.3
Four-Year Progression of Capstone High School's GT/Honors Academy



Throughout their progression in the GT/Honors Academy, Capstone GT students share and present their work, critique the work of others, incorporate feedback and criticism of others into their work, iterate their work, and describe the significance and potential impact of their work. The freshman Advisory class, sophomore Seminar class, junior Colloquium class, and senior Colloquium class all meet once a week for an entire year. Students earn English course credit for their efforts.

Participants from Capstone High School

Morgan Purce (Administrator).

Shortly out of Business school, Morgan was hired to coach Cross Country at a high school near her university. Her experience coaching high school students led her back to school to earn her teaching licensure to teach high school Business courses. Morgan was hired to teach at Capstone High School. After several years of teaching, she

returned to school to earn an MA in Educational Leadership and her Principal's licensure. The Principal at Capstone transitioned Morgan from the classroom and into administration where she serves as an Assistant Principal. As an Assistant Principal, Morgan supervises the Gifted and Talented program and its teachers. She is Capstone's master scheduler and therefore key to creating the time and space for Capstone's GT courses. She is also responsible for the school's Activity, Student Government, and Counseling programs. Morgan worked with others, namely Lynn Mewis, to help start the GT academy at Capstone High School. Her responsibilities also include educator evaluation - she evaluates most of the teachers in the GT academy.

Kristen Harris (Counselor).

Kristen hails from a family of educators and is therefore not surprised that she was called into education. She chose school counseling because of her strong desire to work with students and the challenge of working in schools. Kristen has held various positions spanning pre-K-12. Prior to arriving at Capstone High School, Kristen served as her district's Multi-Tiered System of Supports (MTSS) facilitator, which further expanded her expertise with students and families by introducing her to gifted and talented education. She was hired at Capstone High School following the retirement of one of their counselors. Kristen's case load consists of 370 gifted and talented students. She meets with them regularly and is involved in many aspects of their course registration and overall lives at Capstone - meeting with them all on a rapidly rotating schedule and as needed and requested by her students.

Kristen actively teachers and coaches the staff at Capstone. This work includes topics such as neuroscience, stress management, and well-being. Kristen is involved in

helping students write and monitor their Advanced Learning Plans (ALPs) and Individual Career and Academic Plans (ICAP). She also adeptly works with GT students struggling with anxiety and depression and who may exhibit suicidal tendencies.

David Bellore (Teacher).

David teaches English and coaches the Debate team at his alma mater, Capstone High School. He also guides GT students through their research projects - from the identification of their research problem, writing of their research questions, methodology, data gathering, and summaries and conclusions. He is an integral member of the Capstone High School GT Academy and is passionate about all aspects of teaching and working with students. As an undergraduate, David studied English (after a turn as a Physics major). David has a PhD in Educational Technology. His dissertation study investigated reading and literacy and social media/digital video consumption. Skeptical of educational quick fixes, trends, and fads, David believes that students have remarkable capacities to learn and achieve - his teaching practices are focused on these capacities and blend traditional and tested methods of instruction with the connectivity afforded him and his students by technology. He strives to get his students excited about learning and about the subjects he teaches.

Lynn Mewis (Teacher).

The Gifted and Talented and Honors Academy at Capstone High School exists because Lynn Mewis changed her career. With her degree in political science, Lynn originally began a career working for the Federal government - though she knew, deep inside, that she wanted to teach kids. A few years later, Lynn made the move into education and began teaching at the middle school level in Colorado. Lynn eventually

transferred into a high school position teaching Psychology. Lynn's experience with her own children, who all had been identified as gifted and talented, led her to pursue a master's degree in Gifted Education. It was Lynn's master's thesis that served as the foundation for launching a GT program and the GT/Honors Academy at Capstone High.

As indicated in a survey/questionnaire and summarized in Table 4.2, the participants from Capstone High School average of 16.3 years in education. They all hold advanced degrees in education-related fields. Kristen (counselor) is a newer educator to Capstone High School, while Lynn (teacher) is the most veteran of the group.

Table 4.2
Capstone High School Participant Demographics

Participant	Position	Years in K-12 Education	Years in Current Position	Highest Level Degree Earned
Morgan	Administrator	14	6	Master's
Kristen	Counselor	18	2	Master's
David	Teacher	16	11	Doctorate
Lynn	Teacher	17	12	Master's

The participants all indicated at least moderate knowledge of gifted education, with Lynn, who holds her master's degree in gifted education, indicating an expert level. They all indicated they were most knowledgeable about either the academic needs of gifted learners or their social-emotional needs. Morgan (administrator) and David (teacher) identified academic as their number one topic, while Kristen (counselor) and Lynn (teacher) indicated social-emotional needs as their number one topic. Kristen, the school GT counselor, indicated she is knowledgeable about creating plans to support the

GT learners at Capstone High School. Table 4.3 summarizes the Capstone participants' self-ratings and topics they are most knowledgeable about.

Table 4.3
Capstone High School GT Knowledge

Name (Position)	**Self-rating of the knowledge of gifted education**	**Which GT topics are you most knowledgeable about? (1 = most, 5 = least)**				
		1	**2**	**3**	**4**	**5**
Morgan *Administrator*	Moderate	Academic needs	Social-emotional needs	Creation of plans to support GT learners	GT law and policy	GT identification process
Kristen *Counselor*	Moderate	Social-emotional needs	Creation of plans to support GT learners	GT identification process	Academic needs	GT law and policy
David *Teacher*	Moderate	Academic needs	Social-emotional needs	Creation of plans to support GT learners	GT identification process	GT law and policy
Lynn *Teacher*	Expert	Social-emotional needs	Academic needs	Creation of plans to support GT learners	GT law and policy	GT identification process

Capstone High School Participant Interviews

Recordings from the interviews of Morgan, Kristen, David, and Lynn were transcribed by hand and analyzed. Key comments made by each participant are summarized in Table 4.4. The comments were made in response to interview questions specific to the study's three research questions: agency, curiosity, and confidence. Morgan's comments relate to a school-system level. She discusses the building, the schedule, and the vertical articulation of the GT/Honors Academy. She focuses on tending to her teachers' needs for time and resources and interacts with their students less frequently but is able to notice their progress along their four years. Kristen's

(counselor) comments from her direct involvement in the program as she visits the freshman and sophomore groups and from her individual interactions and counseling sessions with students where she can guide their intensities and help them learn about themselves as learners. David and Lynn speak directly to their classroom interactions and how they facilitate and guide students' questioning and inquiry. Their work is most detailed and speaks to how they are able to adapt as their students' progress deeper into their research. As they adapt, they release more control to their students, which requires them to shift their strategies as they help students manage their projects and their pacing to a state of presentation and completion.

Table 4.4
Capstone High School Participant Comments by Concept

Concept	Participant *Position*	Key Comments Related to Concepts
Agency	Morgan *Administrator*	The vertical nature of our GT program works with our students to help develop their thinking in ways of active contribution – they contribute to themselves and to the program. Students get to explore ideas and then decide what to research. They have a lot to say along the way – a lot of autonomy – it's all about the significance of their ideas. It's a lot of work to make a master schedule that creates the time and space for our program, which is hard for me to say because it's like saying that it's really hard for us to make the time and space in our school for such wonderful learning opportunities for students – opportunities for deep learning.
	Kristen *Counselor*	We all learn better when we have a say in what we're learning about – it's why we get into hobbies and extracurriculars.

		I think choice is huge! We want it as adults. Why in the world would we not want to offer it to students – in appreciable ways? I think we do this here.
	David *Teacher*	Schools can hold GT students back. The reason students can't pursue their passions is because they are so busy jumping through hoops. Students need structure, guidance, and mentorship to pursue their passions and ideas. You can't simply let them loose without expertly guiding them along the way. I take students' ideas and try to fit them into the big picture in ways that they can hopefully show that their ideas are not unrelated to their academics. I think so much of what we do in high school is about teaching kids that what they are interested in doesn't really matter.
	Lynn *Teacher*	Our program allows students to choose from the start – they are able to choose to participate after their freshman year. The programming during the Freshman Advisory year of our program helps empower students to make an informed decision regarding whether or not to continue into the research years. Our counselor, Kristen, also helps students make such a decision. Students in are Seminar and Junior and Senior Colloquium learn to take ownership of their work. It's their idea and their contribution – we guide them and encourage them along the way. We have structures and deadlines and such to help them progress and help transfer ownership. We've found that students aren't typically used to owning and being so involved in their own education.
Curiosity	Morgan *Administrator*	The entire program is built around our students asking their questions and then learning how to investigate their questions. I know the teachers invest

		time guiding them through this process – they teach them how to ask questions that can be researched. When they do this, they have students write and blog as they move along. And they share this work with each other to help sort of refine it all.
	Kristen *Counselor*	I've learned that our GT students tend to be natural questioners – out loud and in their minds. And they build on each other. When my colleague and I were presenting to the freshman advisory recently, we went with their questions and altered our presentation to accommodate their questions. It went well! We emailed them all the copy of our original slides because some wanted to see what we may have bypassed. Many of the students I counsel are interested in learning more about how they learn and think. Perfectionism is a big topic – as is anxiety. We have a process that allows students to ask their questions and how they fit into these concepts – personally.
	David *Teacher*	We have students developing research questions – genuine questions – real questions. These aren't thinking or journaling questions – not questions with right or wrong answers, but the type of questions that, ideally, no one knows the answer to them. High school students don't always have the facility to understand how their passions connect to academia – that takes more knowledge and experience – you need an experienced teacher, one who understands the research process, guiding these classes. I think that's essential.
	Lynn *Teacher*	We are working with the students to expose them to all sorts of opportunities that will generate questions and then within the courses themselves - the entire program at that point is built around the students

		asking questions and then progressing with those questions. We are finding that often the questions and ideas that students investigate are questions and ideas that they have had for many years.
Confidence	Morgan *Administrator*	I get to work with our counseling department, specifically with Kristen, who does a fabulous job of getting to know our GT students and really working with them throughout their four years here. Sure, some of this is natural as they grow up and mature, but I believe that because we created a dedicated counseling position for GT helps ensure social-emotional growth. I think this goes to nurturing GT students' confidence. I also get to see students present their research from time to time in classes and during exhibition of learning events. It's like a time-elapsed effect, which is neat because I can see such tremendous growth in their confidence as they work through their impressive research projects. They shine!
	Kristen *Counselor*	Gauging and nurturing confidence isn't always about increasing confidence. I feel that sometimes confidence is high – and that I need to understand why and how I can help support my students academically. I've learned that this confidence may be high because it is consistent with their ability and their understanding. Students sometimes know a lot about a subject before the first day of class. I often work with students to manage and cope with discrepancies with their confidence and ability and what may be expected of them in classes – which can be too low or too slow. When working with students, I will ask open-ended questions to encourage conversation – albeit short

		due to the large number of students I work with. Our conversations are less transactional this way and they are able to express so much more.
	David *Teacher*	It's vital to help students take their huge research projects and manage them into more bite-sized chunks – so whenever they say that they don't understand how they are going to do this or complete their project, I tell them not to worry and to focus on their next progression in their project rather than the whole thing at once. This was helpful for me as I completed my own PhD dissertation. Students often share their thinking with one another in this program, which really helps them gain confidence and strength from one another. It's sort of a cohort model. It takes a smaller class to address the management of students' projects. I truly try to make it a success-oriented learning environment. There's, what I call, a gradual release that occurs in this process. It's natural, yes, but we design for it. In the end, as a culminating activity, we have a celebration where students show their presentations and research to the school, parents, and faculty.
	Lynn *Teacher*	I think they really enjoy working on their projects and studying what they want to study. They really enjoy having the opportunity to work with the other motivated students - this is a huge part of the draw for students into our program. The GT program is one of solving problems - of working through things methodically to arrive at potential solutions. A vertically aligned program like ours helps students gain confidence in their abilities to do this work at such a high and engaged level.

		Several of our students have turned this experience into a tangible opportunity like paid internships and college and university learning opportunities that tend to be out of the reach of most college freshmen and sophomores. They have wonderful products that they can share with their professors to gain advantages in these areas.

Observations of GT/Honors Academy at Capstone High School

Capstone's GT/Honors Academy is a vertically scaffolded program that spans students' four years of high school. This being the case, observations were made of all four levels (depicted in Figure 4.3). The GT/Honors Academy a program of choice. GT students may join or not join following their freshman Advisory experience. The program, therefore, is one of attrition, as far fewer students remain committed and are participating during their Senior Colloquium course. The GT/Honors Academy was designed predicting this attrition - the Academy educators knew full well that many students would opt into Capstone's myriad educational opportunities. Rather that compete with this, they embrace this reality and structured their program and schedules to best accommodate their students.

The larger number of gifted and talented freshmen requires several sections of Advisory courses and teachers. These classes meet - as do all GT/Honors classes - once a week in working with Capstone's overall school schedule. The classrooms used for the freshman courses - and, again, all of the GT/Honors courses - are not specialized classrooms, but rather individual teacher's classrooms. The design and feel of these rooms is secondary. They serve as mere gathering sites for students and teachers to focus on elements of career and college preparations, social-emotional learning, and

discussing and learning about executive function skills. Students gather and mingle for a period of time as the instructor and presenters gather their thoughts and then disperse their materials. Students sit in rows or larger groups - whichever is best accommodated by the classroom's layout. The format is one of transmission of information, slides are used to provide visuals and text that enhances the teachers' and counselor's messages. Students listen, spend time discussing the ideas with each other, and then ask questions to clarity and extend the material.

The sophomore Seminar class begins to specialize and focus on more global ideas and issues that press society and humanity. They are conducted in a manner more consistent with Socratic methods of instruction: a group or class of around 12-18 students seated around a large table structure made of combined single student desks or of combined two-student tables.

Questions and discussion advance students' thinking regarding community-based, though globally founded, ideas like energy use, pollution, resource mining, education, climate change, and animal and genetic science. On one occasion of observation, college students from a non-profit educational organization were working with Seminar students to continue their precious work of deciding on an agreeable issue to pursue as a group - to organize and investigate. The students were not all in agreement about which issue to adopt. The facilitators spent most of the class period helping them ask their questions and refine the topics to eventually reach a consensus. In doing this, the facilitators employed strategies of group dynamics and a protocol that gave all students time to process and contribute their thinking. Speaking, writing, and note-taking methods helped this along. Quieter and more timid students grew visibly comfortable with the process. More vocal

and visibly outgoing students harmonized with their quieter peers. Loud became quieter and quiet became louder over the period of observation. Next steps, according to the facilitators, was to begin a process of seeking mentors and community partners to contact regarding their chosen topic of inquiry, which was livestock and climate change.

The Junior Colloquium experience at Capstone consisted of one class of students at the time of this study but is expected to grow to at least two classes in the next year as enrollment in the GT/Honors program increases. The Junior Colloquium classroom spends most of its time as an upper-level English classroom. Dozens of individual student desks, arranged in several rows along three of the four walls, result in a perimeter of students accenting a more open area along the fourth side. A teacher's desk sat adjacent to this open area - not too far from a lectern standing proudly, front and center. The walls of this class were heavily adorned with student work from projects and assignments produced from the various English courses also taught in the classroom. The Colloquium students were comfortably spread out - making full use of the extra space their small number afforded them. Though spread out, every student sat near at least one other student as they worked in paper notebooks and on laptop computers. Their focus was on developing their research topics. In doing this, they had worked previously with their peers and their teacher to review current research and studies related to their initial ideas. They, in essence were seeking problems of practice related to their area of interest.

The teacher spent time in consultation with individual students. His process included asking students to summarize their work and their process. He would ask them probing questions to encourage and equip their progress: "Why did you choose to study this topic? How might you decide who participates? What are your next steps? Have you

thought about detailing an early timeline? Why is this important to you? How will you gauge interest in this topic and find a community partner?" He would, from time to time, write in his own notebook to help him record his thoughts and his students' demonstrated progress.

Prior to the end of the sessions, the Junior Colloquium teacher would ask his students to rapidly share their current thinking and progress with the whole class. One time this was done without a time for questions from the other students and another time there was time included for students to ask questions of a clarifying nature. These questions served the purpose of ensuring most other students understood what the sharing student was working in and of affording the sharing student opportunities to deliver increasingly confident and pithy descriptions of their budding research project.

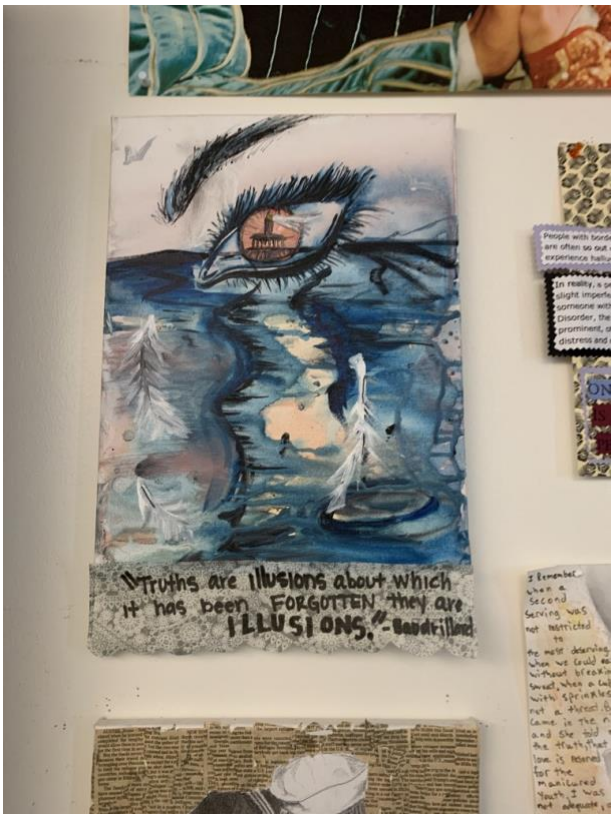
"I like idea of a video ethnography. I need to find examples of this method."

"The article discussed the threshold between platonic and romantic relationships."

"I would need to make a survey asking students about their anxiety regarding shootings."

(Student comments in Junior Colloquium at Capstone)

Figure 4.4
Junior Colloquium Student Artwork



The Senior Colloquium course was taught in a different room that - similar to the Junior Colloquium classroom - spends most of the time serving as an upper-level Social Studies classroom. The individual student desks were also arranged in several rows along predominantly three of the four walls - creating a space along the wall with a whiteboard mounted along most of its length. The whiteboard wall assumed therefore assumed a perceived role as front of the class. A teacher's desk and free -standing lectern also contributed the "front" our forward-facing designation.

Students in the Senior Colloquium class took advantage of the available desks and space afforded their small number. They were spread out but close enough to carry on conversations as needed. The teacher initiated their time together by projecting the Senior Colloquium document that organizes students' periodic summaries of their projects. She asked students to share their progress on the spot with the other students, who responded by asking the presenting student clarifying questions. The presenting student took notes of the other students' responses. The class continued in this manner until all students had shared their progress and work. Table 4.5 lists several of the students' topics.

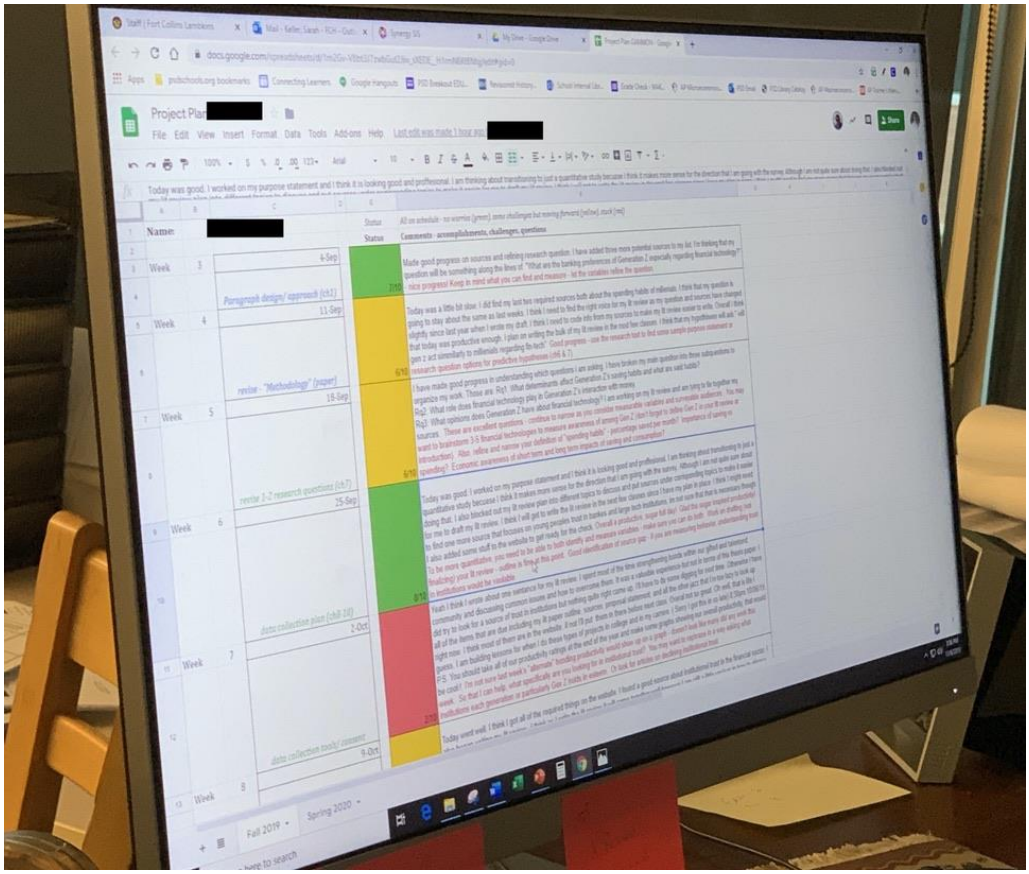
Table 4.5
Examples of Capstone High School Senior Research Questions

GT/Honors Academy Student Research Questions
How do less lethal methods impact police violence and uses of force?
How might Generation Z's use of cashless transactions alter global financial markets?
Why does childhood trauma create lasting effects in people?
How do horse swirl patterns affect their temperament?
How does later high school start times affect student caffeine intake?

After sharing their progress, the students worked independently on their projects. They would occasionally approach each other and have quiet conversations. Using their

laptops, students were updating their documents that are shared with their teacher. Their teacher, in turn, was also responding to their comments digitally and – at time – in person. Figure 4.5 is of a student's shared reflection and progress log.

Figure 4.5
Teacher Interface of Student Project Reflection Document



Summary of Capstone High School

The GT/Honors Academy at Capstone High School is a four-year, vertically scaffolded program that guides its students through a research project probing into a topic of interest to the student that ties to the student's community. All GT students at Capstone High participate in the initial freshman course called Advisory. After their freshman year, students may choose to continue in the program and develop a research

project. Upon graduation from Capstone High School, students who have successfully completed the GT/Honors Academy received a special designation on their diplomas. Beyond that, the participants in this study cite the myriad experiences that their students encounter. As they justify the need and purpose of their study, develop research questions, methodology, and data collection tools, and as they gather, analyze, and summarize their data and findings, students are exposed to a level of knowledge application that probes deeper than a traditional curriculum of study.

The program is supported by administration and a dedicated counselor. Not only does the program include and address social-emotional needs and executive functioning strategies, students in the GT/Honors Academy receive more nuanced attention and guidance from their teachers, counselor, and administrator. Beyond the initial choice to participate in the GT/Honors Academy, students are faced with numerous choices that they must make along the way. They are guided through this process by attentive teachers who gradually recede and shift their methods of guidance. They support their students' agency – not giving them an overwhelming amount of choice too soon. By their constant interaction and process of reflection and individual meetings, GT/Honors Academy educators are situated to monitor their students' levels of confidence – and learning to tend to their progress through a complex project. All participants mention students' abilities to self-advocate and share their work and how their prowess in doing so increases rapidly throughout their years. In the GT/Honors Academy, students learn to re-engage with their curiosity and interests. The four-year progression at Capstone High School guides this process forward – and allows students to "go further and deeper and make connections," according to David (teacher), "exercise self-determination,"

according to Kristen (counselor), “build trusting relationships,” according to Lynn (teacher), and “add tremendous relevance to their learning,” according to Morgan (administrator).

Global High School

“The world we live in is one of constant and rapid change and real and pressing problems. We will confront these problems with an interdisciplinary approach that empowers students to create and shape their futures.”

(Global High School Futurology Course Syllabus)

I gave myself a pat on the back, having made it successfully through the school’s parking lot, security kiosk, and main hallways. I bumped into no fewer than three students as I walked down a second sun-drenched hallway looking for an “obvious” (in the judgement of the security guard) set of stairs to take me to the level below - and eventually to the classroom of a course called “Futurology.”

Down the stairs and into a blue and white checkered tiled hallway I went in search of room 9800. The seemingly normal and boring fake wood door with a small rectangular window was like a gateway to another dimension as I slowly opened it and transported myself into the future – or at least into a class called Futurology.

The classroom was huge. It was disorienting at first until l realized it was two rooms connected by the type of wall that can be pulled back to create a much larger learning space. The walls were covered in the sort of artwork, maps, and posters that draw you in. Several walls were floor to ceiling chalk boards or white boards. Books were everywhere - covering almost every square inch of the many large desks the occupied the four extreme corners of the mostly rectangular room. Large rectangular

student desks were spread throughout the room - creating nooks and crannies of pure function. There was a palpable buzz of activity - of the sort that you can feel inside your chest and a vibe that can only be described as joyful and optimistic comfort.

I quickly counted over fifty students, but the room didn't seem crowded. Grouped into four large areas, the students were talking, listening, typing, writing, and thinking - furrowed brows and off-centered squints and gazes were everywhere. The two teachers were identifiable by the mugs of coffee they carried with them as they flanked the room. I asked a student in one group what they were working on, he said, "Super Intelligence." Another student from an adjacent group said, "Designer Babies." Before I could even ask, a girl from the third group turned slightly and sort of yelled, "The death of democracy!" The fourth and last group was the quietest. I asked the whole group about their topic and three students looked up from their laptops and, almost in harmony, said, "Malevolent AI." Before I could ask, one of the teachers, who had somehow snuck up behind me, whispered, "AI means Artificial Intelligence," and then took a sip of his black coffee. I said thank you - he nodded and then said quietly, in a way I learned is consistent with his more introverted personality, "They're just getting started, wait until we all see where it's going."

About Global High School

"We work to make a big school smaller and more responsive to students."

(Scott Wise, Global High School)

Global High School is designed around four small learning communities called academies. These academies are titled Biotechnology & Health Sciences (BHS), Leadership, Global Studies, and Communication (LGC), Science, Technology,

Engineering, and Mathematics (STEM), and Visual and Performing Arts (VPA). Each academy has its own cadre of content teachers spanning disciplines like Art, Business, English, Mathematics, Science, Social Studies, Physical Education, and World Languages. They are essentially schools within a larger school. Students self-select into one of these four academies and are organized into Advisement classes. Advisement classes at Global High School are increasingly cluster grouped for gifted and talented (GT) students. The GT advisement teachers have all received professional development in gifted and talented education and the academic and social-emotional needs of GT learners.

Global High School offers well over 200 courses. These courses include Advanced Placement, Concurrent Enrollment, and honors-level courses, as well as, specialized electives in Biotechnology, Engineering, and Leadership. Global also offers several interdisciplinary courses that synthesize two or more disciplines, for example, art and science, science and history, and mathematics and science. Global High also offers a vast selection of sports and extracurricular clubs and academic competitions like Technology Student Association (TSA) and Debate. The master schedule process at Global High School is aligned with the school's mission, which is to "transform high school learning through meaningful relationships, relevant learning, and a rigorous academic environment" (Global, n.d.). It is created to offer engaging and proposed courses that are proposed by teachers - often with students' input.

One such course was proposed by Matt Fonseca and Ken Dickson, both participants in this study. They proposed an interdisciplinary course co-taught by Matt - a Social Studies teacher - and Ken - a Science teacher - to identify and analyze pressing

global issues. They proposed a class built entirely on students' questions and called the class Futurology. The course, once offered, became an engaging draw for Global High School students - especially Global High's GT students. Global High School maintains an accelerated schedule of classes that affords students the opportunity to take more classes than a more traditional schedule. Global students, therefore, are able to accommodate courses like Futurology without sacrificing other classes if interest.

Many of the questioning techniques employed by Matt and Ken in Futurology are also used in Matt's sophomore level Honors Humanities class and Ken's Biotechnology classes, thus students often feel like Futurology is an appropriate class to consider during their Junior or Senior years of high school. Futurology is offered twice a year to classes of 40 to 50 students. Students receive credit in science and social science upon completion of the Futurology course.

Participants from Global High School

Scott Wise (Administrator).

Scott has deep connections to the Global High School area and community. While Scott did not attend Global High, he did attend a neighboring high school in the district where he was active in academics, sports, and extracurricular activities. Scott was inspired by several of his teachers, his English teacher in particular, and decided at an early age that he wanted to teach. Scott continued his athletic career in college as he studied to become a teacher. His early desire to teach high school English transformed into a degree in History and a license to teach Social Studies.

Relatively early in his teaching and coaching career, one of his administrators identified Scott's potential for leadership and encouraged him to enter administration.

Scott earned his Principal's license but continued to teach and coach until a new opportunity was presented to him: open Global High School.

In the early days of Global High's founding, Scott served as a teacher and administrator before growth of the school demanded he move full time into administration. Scott now serves as an Assistant Principal at Global High and leads the school's counseling department and activities and clubs. He evaluates and coaches teachers and is responsible for the creation of the school's master schedule. In his position, Scott has been crucial to the creation of courses like Futurology and several others that provide GT students myriad opportunities.

Aaron Lorry (Counselor).

Steeped in experience in schools and churches, Dr. Aaron Lorry is passionate about identifying and addressing the social-emotional needs of his students and is particularly adept at working with Gifted and Talented (GT) populations. Aaron entered education in his home state of Indiana and slowly worked his way west to Colorado. In addition to his work with Global High students, Aaron travels the world visiting his family and consulting organizations in far-away locations like China and Japan. Aaron acknowledges that working with GT students, especially with twice-exceptional students, has required him to learn and network beyond what he learned in his undergraduate, masters, and doctorate studies. He proudly serves as a lead counselor at Global for GT students, as a resource for teachers and administrators, and as an advocate for GT students and their families.

Ken Dickson (Teacher).

Ken committed himself to studying the fields of Biology and Molecular Biology before entering K-12 education as a high school science teacher. As a university tutor focusing on student athletes, Ken grew to love helping "lessen abstraction" and make complex ideas simpler when broken down according to their first principles - he then made the decision to scale his efforts to working in classrooms of students.

At Global High, Ken has taught almost every science class that is offered. Prior to teaming with History teacher Matt Fonseca, Ken re-launched Global High School's Biotechnology program - scaffolding the program into three levels of coursework and designing each level in ways that afford students opportunities to apply their learning within the classroom and beyond into contemporary research studies.

As a co-creator of Global High School's Futurology class, Ken works with his students to forward interdisciplinary and transdisciplinary nature of scientific study.

Matt Fonseca (Teacher).

Matt was a serious student of History and Journalism in college and always desired to demonstrate his expertise and passion to eager high school students. His love for History and world affairs only grew with Matt's time serving in the United States Marine Corps. His time as Editor-in-Chief of his university newspaper encouraged his ability to write and communicate ideas.

Though a newer teacher, Matt made an immediate impact once hired at Global High. His quiet strength and desire to collaborate with other teachers helped create attractive learning opportunities for GT learners. He was instrumental in iterating honors-level Humanities courses and for designing a new course built entirely around student

inquiry and passion named Futurology. In doing this, Matt sought out opportunities to learn more about gifted education and working with GT students. His courses reflect many of the best and engaging practices for motivated GT students.

As indicated in a survey/questionnaire and summarized in Table 4.6, the participants from Global High School average 14.5 years in education. Scott (administrator) and Aaron (counselor) hold advanced degrees in education and in counseling, respectively. Ken and Matt both hold bachelor's degrees. Ken (teacher) is a newer educator to Global High School, while Scott (administrator) is the most veteran of the group.

Table 4.6
Global High School Participant Demographics

Participant	Position	Years in K-12 Education	Years in Current Position	Highest Level Degree Earned
Scott	Administrator	19	14	Master's
Aaron	Counselor	25	10	Doctorate
Ken	Teacher	6	5	Bachelor's
Matt	Teacher	8	7	Bachelor's

The participants all indicated at least moderate knowledge of gifted education, with Scott, being the exception. He rated himself as basic and indicated in his interviews and member check that he never received any professional development or training in gifted education as a teacher but has recently received such training as an administrator as part of some recent school-wide initiatives at Global High School. Scott (administrator), Ken (teacher), and Matt (teacher) all indicated academic needs as the GT topic they were most knowledgeable about. Aaron (counselor) indicated social-emotional needs as his

number one area and academic needs as his number two. Both Ken and Matt indicated social-emotional needs as their second most knowledgeable area, while Scott indicated GT law and policy as his second most knowledgeable topic. Table 4.7 summarizes the Global High School participants' self-ratings and topics they are most knowledgeable about.

Table 4.7
Global High School GT Knowledge

Name ***Position***	**Self-rating of the knowledge of gifted education**	**Which GT topics are you most knowledgeable about? (1 = most, 5 = least)**				
		1	**2**	**3**	**4**	**5**
Scott *Administrator*	Basic	Academic needs	GT law and policy	GT identification process	Creation of plans to support GT learners	Social-emotional needs
Aaron *Counselor*	Moderate	Social-emotional needs	Academic needs	Creation of plans to support GT learners	GT law and policy	GT identification process
Ken *Teacher*	Moderate	Academic needs	Social-emotional needs	Creation of plans to support GT learners	GT identification process	GT law and policy
Matt *Teacher*	Moderate	Academic needs	Social-emotional needs	Creation of plans to support GT learners	GT identification process	GT law and policy

Global High School Participant Interviews

Recordings from the interviews of Scott, Aaron, Ken, and Matt were transcribed and analyzed. Key comments made by each participant are summarized in Table 4.8. The comments were made in response to interview questions specific to the study's three research questions: agency, curiosity, and confidence. Scott (administrator) reflects on his work with regards to Global High School's master schedule and to the course registration

process. He strives to create a system that holds up Global High School's unique efforts on behalf of its GT students, while not creating redundancy and confusion in the larger system. Scott believes in co-teaching and in interdisciplinary study as methods that can create rich experiences for students.

Aaron (counselor) reflects on how he has learned to listen to his GT students and to consider novel approaches to creating their schedules of course. He acknowledges that many of their experiences are intense and that they notice and experience learning differently from most of his non-GT students. He has developed procedures and techniques to help him address their varying interests and needs. He promotes Global High School's unique courses depending on what his students share with him. He's learned over the years that GT students can mask some of their opinions and ideas – he strives to help them share these without fear.

Ken and Matt (teachers) both discuss the amount of planning and design that they put into their Futurology course. They feel like this is essential to empowering students. "It's far from a free-for-all," says Matt, "we know our subjects and have worked hard to create the boundaries that define the course objectives – so students can explore within these boundaries." Ken and Matt both talk about the importance of learning with their students, which helps them be "the best and most understanding listeners of their students' thinking," according to Ken. They want students to remember their experiences in Futurology.

Table 4.8
Global High School Participant Comments by Concept

Concept	Participant ***Position***	Key Comments Related to Concepts
Agency	Scott *Administrator*	As a school, and especially for our GT students, we are extremely accommodating with respect to scheduling and creative problem solving to create challenge. I think we are open-minded and want to work to "yes." As the master-scheduler, I am also open to teachers' suggestions and to building on their ideas on behalf of their students, again, especially advanced and GT students. This is how we ended up with unique classes like Futurology and Biotechnology and some other interdisciplinary options.
	Aaron *Counselor*	Students have a growing number of course offerings these days. Many of my GT students know exactly what they are interested in – and many others know what they've been told they are good in. I spend time working with my students to help them think beyond course titles and into what they spend their free time thinking about and reading about. This helps with planning and registration. I often can hand-schedule students into the classes of specific teachers. These are teachers who have some deeper content knowledge and such. I find teachers like these can best meet the needs of our GT students and be responsive to them. Sometimes students have fairly involved ideas that they express in their advanced learning plans. We work together to break these down into realistic, timely, and more achievable phases.

	Ken *Teacher*	Our students, especially our gifted students, have a lot to say when they are listened to - and respected. Students can engage in courses like Futurology that are absolutely designed to empower them. A lot of work goes into setting the boundaries for their inquiries. A common misconception can be that the course is hands off and that students are set free to do what they want. Yes, partially, but only focused and experienced observers will recognize the large amount of design behind their efforts. I call that front-loading so I can back off as students take more control.
	Matt *Teacher*	An interdisciplinary approach, like that in Futurology and Honors Humanities, allows me to give students a lot of different access points so students can engage and include their interests - and, as often is the case, figure out what they are interested in. I am always open to listening to ideas and suggestions that may impact students' learning or the way they demonstrate what they have learned. I understand my content area enough to be flexible and to differentiate as needed. Students can shoot to high levels really fast when they are given a say into how they learn. Doing this takes a lot of planning up front on my end so it's not a circus or an environment of do whatever you want however you want whenever you want. There's a lot of structure in my planning - this structure gives students the necessary freedom to really excel.
Curiosity	Scott *Administrator*	I think many teachers offer choice in terms of projects, papers, and activities. Classes like Futurology are built entirely on student questions and their drive to research and answer their questions. It's important for me to support these

		teachers - to get them the resources they need to do this well. As an evaluator and coach of teachers, I work hard to make sure unique classes and programs are understood in the broader system so one area doesn't not bureaucratically and unnecessarily compete with another.
	Aaron *Counselor*	You have to, as a counselor, let students ask their questions – especially gifted students. I find that gifted students can be fairly honest about what they are thinking – what's on their minds. They can be pretty intense about this too. We use tools, like shared documents, to capture a lot of this. We can use them to reflect on social-emotional areas of growth and maturation. Gifted students can spend a lot of time with their own thoughts. I strive to provide outlets for this thinking – to help them understand who they are and how to develop their curiosity – so many are question-askers.
	Ken *Teacher*	I've learned quite a bit about how to guide students to ask big questions and then develop methods by which to answer or address their questions. It's addictive to witness the moments when my students learn more about themselves and their motivations as they participate in our activities. Many modern and current areas of biological research have societal and global impacts. My GT students are especially drawn to such application.
	Matt *Teacher*	Our Futurology class is built entirely on students' questions. We guide them through a process that helps them ask these questions - often tied to large categories of interdisciplinary and global topics. It's great to see them reconnect with asking questions - it's almost as if they've learned to not ask questions.

		Our GT students especially - they can be hesitant - generally speaking at first. It's almost as if they are waiting to make sure this is a real opportunity to dive into their ideas. Once they do, they tend to really take off.
Confidence	Scott *Administrator*	From my perspective as an administrator, it's important that GT students see that their ideas have impact and can initiate proper change. This builds confidence. I get opportunities to work with counselors and administrators to look into some academic issues that can arise when a student, a GT student, shares his/her experiences. Often these students' criticism of a class or an experience extend well beyond a letter grade and into something much more profound, like, say, how a world view or religion is fairly or unfairly discussed in a class or how a class either does or doesn't address current events - usually big global events that are truly on the minds of students - especially, in my experience, GT students.
	Aaron *Counselor*	I often listen to our GT students and tell them what I'm hearing. This, I'm afraid, isn't something that they are used to in schools. Their confidence grows as they begin to share what is really on their minds – it's more than us getting to know each other. It's really them getting to know themselves and their interests. I've found that GT students have been told by well-intentioned teachers that they should go into certain professions because they are good in classes. This can stress my students as gets in their way to distinguish what really matters to them. I structure time for our GT students to spend together. We do this in Advisement, but also during lunches from time to time. There's a connection that many make when they spend time together. They can

		have the conversations they want. I've found this is consistent with many of the social-emotional objectives and goals. Not all of my GT students struggle in social situations, but many do. Getting together for a speaker or to have lunch is helpful and adds confidence.
	Ken *Teacher*	Students share their thinking by writing and presenting - almost continuously. I have a front row seat to their development, which accompanies a budding confidence in themselves and in their knowledge and skills. We sort of re-write the way students are used to presenting. We present and share in short bursts of time rather than mandating long-form presentations. It's constant iteration and design, but we don't stick to any one protocol, like, say, design thinking. We're knowledgeable about these techniques, but we use what we think is right for our students.
	Matt *Teacher*	It's important to give students the space to wrap their minds around their questions - to wrestle with ideas and to - metaphorically speaking - run into walls and fail or experience setbacks. We do so much sharing of progress in our classes that students can see that they all are experiencing this. We use blogs, websites, and such to curate our work, which makes this sharing really natural. My partner and I are in this journey together with our students. It's a real collaboration. We all learn from each other. When we start a class by watching a news story together, we guide the conversation amongst our students, but we also participate at times. If I'm not sure how or why something happened in the world, I'll tell students that I'll find out. It's not a weakness to not know - it's more important that I demonstrate the ability and desire to chase down an answer or to solve a problem.

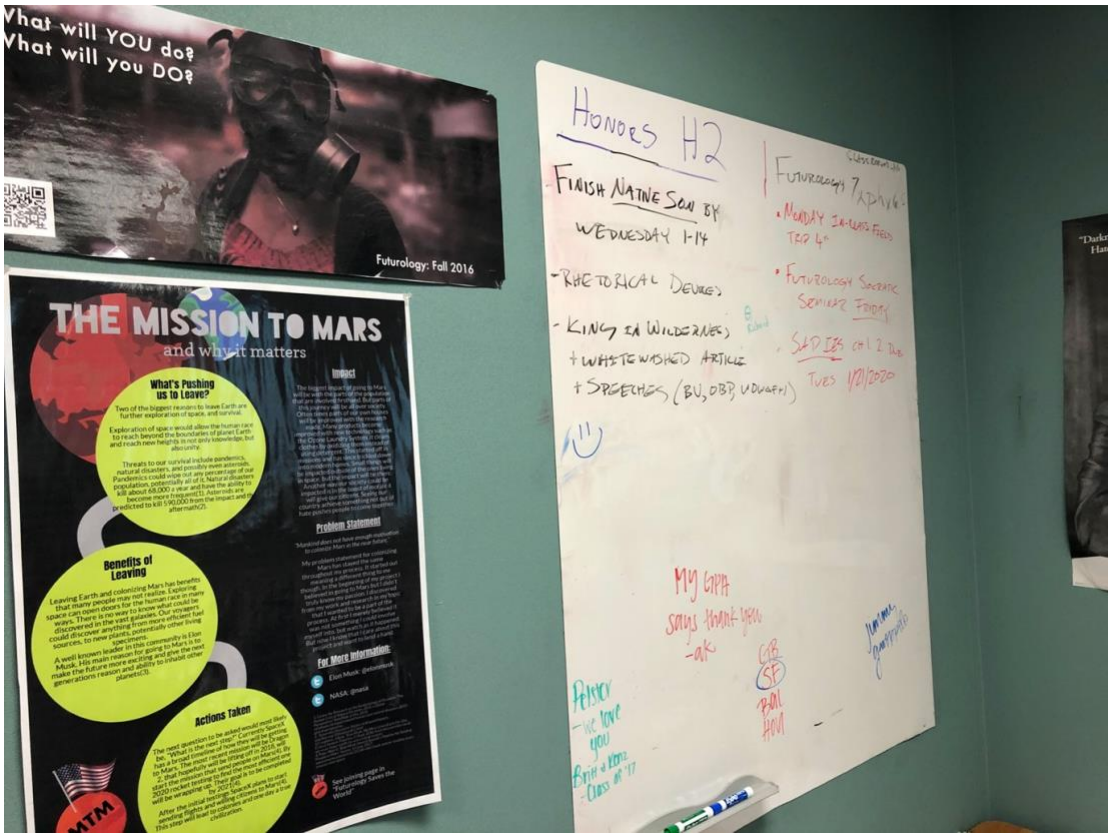
		Using some of the available technology is really good for our quieter or more introverted students. It gives them a voice without pushing them too hard initially.

Observations of Global High School

Though Global High School differentiates heavily by course selection (well over 200 courses) and offers several specialized courses that are popular with its gifted learners, Futurology is the class most consistently appropriate with the purpose and questions of this study. Most observations at Global High were in and of the Futurology learning environment. Course documents and virtual environments were also studied as part of this process.

Entering the Futurology learning environment is an experience in and of itself. The room looks larger than most, until you realize that it's two rooms that are separated by a modular wall that they always have open. The rooms are pure function. The rooms are surrounded by student-built bookcases that are chock full of books stores there by students and teachers. Walls are liberally covered by whiteboard and chalkboard material - surfaces that can be spontaneously used to communicate ideas in words and pictures. Provocative and tonight-creating artwork adorns the perimeter of the room. Everywhere you look you see words and pictures that may make you wonder and ask. One corner of the room has a coffee maker complete with all the fixings. Teachers use this area and so do students. No one seems to mind as a student puts the last of the coffee into his stained mug and then leaves the class and returns a moment later with a carafe full of water to make a fresh batch of coffee.

Figure 4.6
Artwork and Furniture in the Futurology Classroom



The teachers, Ken and Matt, mingle with their students, they play chess and discuss current events and topics like “CRISPR-Cas9,” the “rights of indigenous peoples,” and “cost benefits of maintaining a manned station on Luna - our moon.” And this is all happening during a passing period - as students travel from their last class period to their next period, which is Futurology. While many students take their time as they walk to their next class, the Futurology room is filling with students with minutes to spare.

Students, many identified as Gifted and Talented (GT), set aside their Calculus 3, Literature, Chemistry, and Engineering materials to pick up laptops and books from the bookcases with titles like *Sapiens*, *Pandora’s Lab*, and *Guns, Germs, and Steel*. They

rearrange tables and desks to form groups and ask each other questions that often begin with, “Did you hear about?” and “Have you read the latest?” As they take their seats, one of their teachers, Matt Fonseca, mug of black coffee in one hand, approaches the projector screen along one side of the room and says, “Welcome. It’s nice to see you all,” and then clicks something in the laptop siting on an adjacent desk. Immediately, the blank screen is filled with the opening scenes from the news show “Democracy Now!” and the students quiet to watch. A minute into the show the school bell rings announcing the start of classes - but no one in Futurology hears it. The students, all 47 of them, are gathered mostly in the half of classroom that has the screen. The teachers, Ken and Matt, flank the students on both sides. Matt stands with his mug of coffee near a group of seated students. Ken is on the other side, closer to the screen - with one arm across his chest and the other angled to support his chin with his hand - a thinker’s pose.

After the news stories end, the room is silent for one minute. Both teachers appear deep in thought. Several students are writing in notebooks, some are typing quietly on their laptops - most are looking down and appear to be concentrating. “Ready,” asks Ken - the students all focus on him. Heads nod and many students respond with a verbal “Yes!” - “Alright, then, let’s go,” says Ken, and the room explodes with energy as students stand, move around, and mingle with each other. Conversations overlap, but it is easy to hear that they are talking about the various stories depicted in the news video. After close to five minutes of this engaged conversation, Matt quiets the class and apologizes for interrupting them. He asks them to choose a seat and then transitions the class into a protocol employed often in Futurology: an “any questions” or simply “anyqs” session where students free-flow their open-ended questions. On this day they engage in a

ten-minute cycle of hand-raising and then question asking. Ken and Matt respond by thanking students for their questions. They absorb the questions and do not pass any form of judgement in the form of praise or critique. They simply respond with, “Thank you.”

Students in Futurology often begin their classes by watching a news cycle story like “Democracy Now!” or CNN-10 and they always include some form of “anyqs” in response. Sometimes they write their questions, sometimes they work in small groups, but they always share. The first three weeks of Futurology are engaged in a scaffolded approach to asking open-ended questions, sharing their questions, investigating their questions, and sharing their results in a rapid manner. Students, according to Ken and Matt, are re-learning how to ask their sincere and personal questions.

Figure 4.7
Futurology Students in Reflection After Watching a News Show

Grouped Questions Protocol.

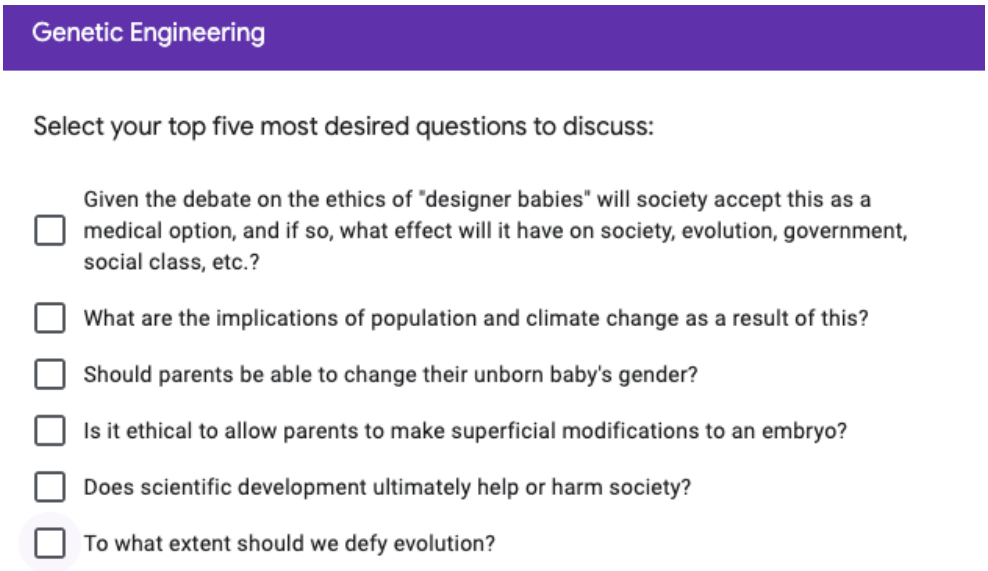
Following a virtual conference session with a scholar from a Future Studies Institute in Hawaii, students are asked to consider three broad categories of topics that they will investigate during the course of their Futurology class: Genetic Engineering (Designer Babies), Super Intelligence (Artificial Intelligence), Democracy (Death and Evolution). As the first major activity in the class, Ken and Matt spend time discussing group dynamics and guide students as they investigate several questions for each category. Three groups of approximately 15 to 20 each form - one for each category and students spend time together and individually addressing the topics and what they are learning as they investigate the questions associated with each topic. During this time, Ken and Matt circulate and spend time with each group - they also spend time in individual consultation with each student. In consultation with gifted and talented

students, Ken and Matt ask each student about their Advanced Learning Plans (ALP) goals and will review their documents together with the students to identify any overlaps with their plans and their potential work in Futurology. Where discrepancies lie between students' goals and the course objectives, Ken and Matt make several suggestions to students to write additional goals into their ALPs that may add relevance to their plans. The time spent with individual students happens in harmony with the three groups' investigation time. The classroom is buzzing with energy and activity.

Fishbowl Discussion.

The activity evolves by asking the three large groups to divide into smaller groups of three to five students. Each of these groups spends time writing their own open-ended questions regarding their respective topic/category. The questions developed by these smaller groups are collected and organized into an online survey, which students respond use to vote their top five "most desired" questions to discuss.

Figure 4.8
Student-Generated Questions Presented as Options for Class Discussion



Super-Intelligence

Select your top five most desired questions to discuss:

- [ ] Could an AI be malevolent and why?
- [ ] At what point did civilizations lose leverage and collapse?
- [ ] Will AI be able to make ethical decisions?
- [ ] Will AI eventually be able to outsmart humans?
- [ ] If AI is inevitable, who or what will be in charge of certain restrictions on a global scale or within individual countries?
- [ ] Who is the first to access super intelligence?

Death of Democracy

Select your top five most desired questions to discuss:

- [ ] What is a true democracy?
- [ ] Will democratic backsliding lead to a fall of democracy in the US?
- [ ] Does democracy have a "shelf-life"?
- [ ] Is there even a form of government that exists that isn't corrupt?
- [ ] Is democracy dying or the quality of democracy?
- [ ] How does democracy in our country relate to the stages of grief?
- [ ] Is our government regressing compared to other governments?
- [ ] How and why did the Roman Empire fail?
- [ ] What makes a democracy? Now vs. then.
- [ ] How is democracy affected from an economic standpoint?
- [ ] What elements will destroy democracy?
- [ ] What do we define as democracy?
- [ ] What needs to happen in order for a democracy to function?
- [ ] Is democracy in the hands of the government or of the people?
- [ ] Will the breakdown of mutual toleration and forbearance be the downfall of democracy?

The culmination of this activity is a fishbowl-type activity where each of the three groups spends up to 20 minutes in discussion - in front of an audience consisting of the other two groups, their teachers, and any observing students or teachers. Having spent significant time formulating and investigating their questions, these fishbowl discussions are lively. They conclude with opportunities for audience members to ask any questions that they developed as they observed the group's discussion. This category/topic, large group, small group, question writing, and discussion preparation activity served as the Futurology class' first exposure to a procedure that will be repeated and iterated as the course progresses and as additional content is discussed and studied. Students will develop their individual inquiries as the structure of the course and activity of the teachers promotes the advancement of their interdisciplinary and global thinking regarding ideas of science, history, and societies.

Figure 4.9

Futurology Students Discussing Their Chosen Questions for the First Time

Ken and Matt and their Futurology students maintain a robust and consistent digital presence. The class has a website that organizes course documents like their syllabus, videos, and commentary from former students. Students create websites to organize their reflections. The active course has a presence in Google Classroom (GC), where the platform serves primarily as a continuous flow of the course's consciousness. New articles and media are posted with great frequency and students and teachers, alike, make comments on the ideas. The initial post in GC is of a shared presentation document. The prompt asks students to create a slide that names a future technology of interest, to include an image, and to be prepared to spend a brief minute the following day sharing about the technology and why they chose it. Ken and Matt use activities like this one to

amplify students' voices and extend their learning activity beyond school hours and days. They incorporated GC into Futurology after students made the suggestion to do so.

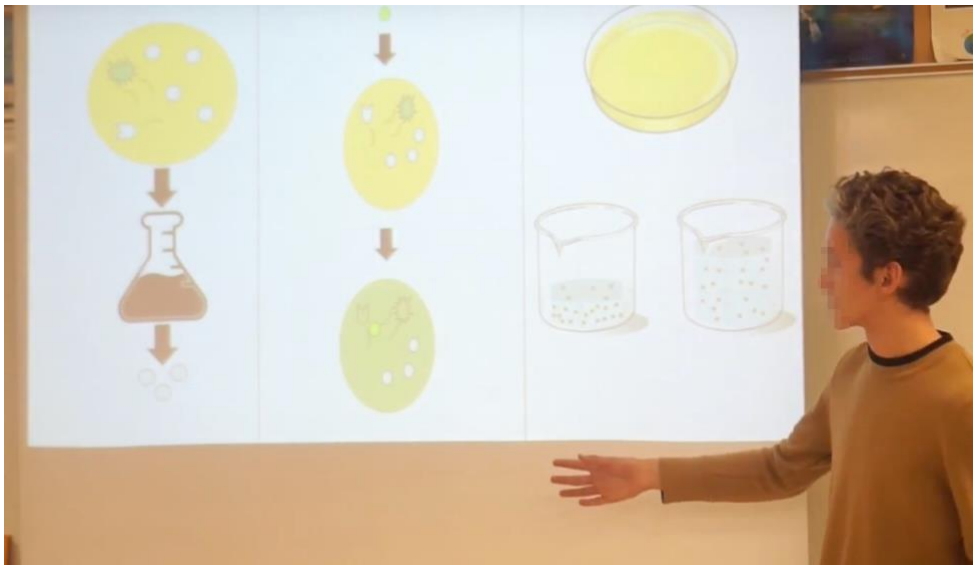
Exhibition of Learning.

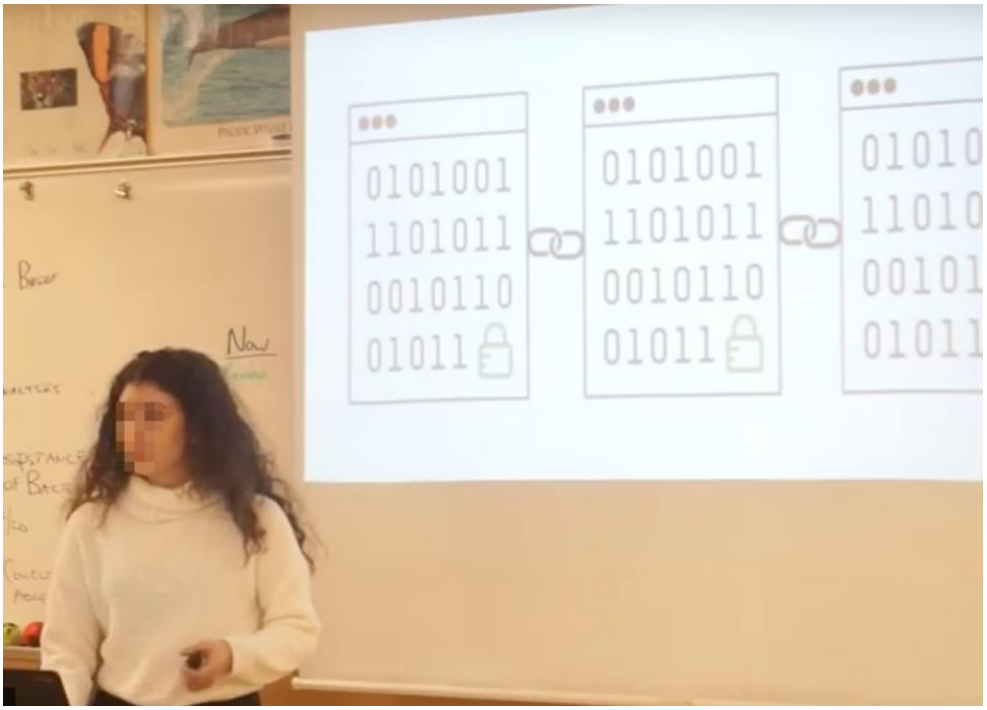
The structured process of question formulation, investigation, and group discussion is utilized throughout a Futurology course. According to Ken, it becomes second nature to the students – no matter how extroverted or introverted students behave. The structure put in place during the first days of the class are expanded into opportunities to share with larger and less informed audiences. Throughout the class, Futurology students are invited to share their research projects with other classes – acting as guest teachers and lecturers of sort. They also participate, voluntarily, in two afternoon and evening exhibitions of learning, which then culminate in a more formal and summative session that signals and celebrates the end of the course. Ken and Matt both cite these events as excellent instances to gauge students' growth in confidence, poise, and in their abilities to communicate their research findings and processes. Feedback from past courses indicates that students, especially GT students, found the networking with community members and those who work professionally in the fields associated with their projects was especially rewarding and encouraging (Global, 2018). Table 4.9 organizes several past Futurology research questions asked by GT students that were presented at exhibition of learning events.

Table 4.9
Examples of Global High School Futurology Inquiry Questions

Futurology GT Student Research Questions
How will the world change if we continue to use fossil fuels?
How does habitat loss fuel climate change?
How do GMOs impact our health?
How will Artificial Intelligence (AI) impact the way we learn?
How have politics impacted climate change?
How can a high school student solve the Cambodian genocide?
Is the news telling the truth?
What does the world look like without water?
How might we decrease the cost of prescription drugs?
How has an increasing disconnection with the outdoors and nature impacted society?
How has social media polarized America?
Are antibiotics obsolete in an age of biotechnology?
How does a lack of efficiency in healthcare impact patients?
How can we control our own evolution?
How do we feed the world in a healthy and sustainable manner?
What action can eliminate poverty?
How might war be beneficial?
What if education was done differently?
How will Artificial Intelligence (AI) change the global economy?
How might we eliminate waitlists for organ transplants?
Are we on the frontier of curing all disease?
How do we prevent civilian deaths in warfare?
How can you tell if news outlets are telling you the truth?
How is social media addictive?
How could overpopulation end humanity?
How will we get to Mars?
How can we terraform Mars and save Earth from climate change – at the same time?
How might new forms of medical body scans transform medicine?
How can we have informed discussions regarding the potential of gene editing technology?

Figure 4.10
Futurology Students Sharing During Exhibition of Learning Night





Summary of Global High School

Global High School offers unique programming options to its GT students in the school's overall effort to "transform high school education through meaningful relationships, relevant learning, and rigorous academics." In addition to academies organized as small learning communities, Global High School offers clustered advisements, organized by academy, and taught by teachers with basic or higher training in gifted education. The school offers niche electives in the fields of engineering, biotechnology, and robotics. Global High School also offers several interdisciplinary courses for students to consider. These courses offer learning experiences that encourage synthesis of ideas and that award its students credit in two or more subject areas. Futurology is a popular interdisciplinary option at Global High School. The course

synthesizes areas of science with those of social science to address global problems and opportunities. Futurology is a relatively large class that typically enrolls over fifty students per section. It is co-taught by a science teacher and a social science and history teacher. In Futurology, students learn techniques of asking research questions and how to investigate their questions to potentially offer a solution for humanity's consideration. The class meets daily for 90 minutes over the course of a semester, which is approximately 18 weeks long. Teachers guide and mentor students as they progress through their projects, which often involve the consultation of community partners and dynamic input from numerous sources of information (e.g. news, videos, social media, articles, and book studies). Futurology students, gifted and talented among them, are exposed to techniques of sharing their learning progress often and to asking for specific and needed feedback from their audiences and peers.

Administration and counselors at Global High School support efforts like Futurology on behalf of GT students. They work in tandem to create the time and space for the course to run and promote the course to students. In doing so, both administration and especially counselors., work closely with GT students and their nuanced interests and intensities. Futurology students often invite their counselors and school administrators to their exhibition of learning events, which is demonstrative of the school's commitment to relationships and rigorous and relevant learning.

Personalized High School

"Have you heard the horrendous news about what's happening in the camps in China?"

"No, not yet, I had a soccer tournament last weekend."

(Hallway conversation between two Personalized High students)

A few tight turns, then up and down some gently rolling hills is what it took for me to arrive at Personalized High School. Set within a small guarded industrial center located amidst a cozy North Eastern town - not quite New England or New York, but close enough to consider both valued neighbors. It was close to nine o'clock on a crisp autumn morning when I pulled up and parked my car. I recognized the school's logo in a window, but that was the only indication that I was at a school. The street-facing wall of the building looked as if it could be an entrance to an industrial print shop or something similar. One of the long sides of the building had an asphalt parking lot that was waking up with morning drop-off traffic. The other long side of the building backed to a slight incline, which separated this particular building with the adjacent row. Noticing the trickle of cars pulling into and out of the side parking lot, I decided that the entrance must be around back, not in front near the logo and the printshop looking elevation.

Around back I noticed some patio furniture and a van with the school's logo on the side near a bright red awning protecting a set of doors. I opened one of the darkly tinted doors and was immediately greeted by a grinning student who was standing with her back to a wall of lockers. She looked ten years-old but told me she was twelve. The book she carried in her left hand said, "Calculus." She said hello and then asked me if I was lost. I told her who I was looking for and why I was at her school. She said, "Great, welcome - you're at the back door," then she told me to keep walking through the long,

colorful and vibrant school to the front before turning and walking away. Not ten steps away she turned back and asked, “Do you like kickball?” I told her I did. “Great! Go out back during lunch.” And with that she turned around a corner wall partition and into - what I learned later - her math classroom.

About Personalized High School

“We’re on to something here.”

(James Reed, Principal of Personalized High School)

There isn’t merely one Personalized High School, there are several and they are all, well, personalized. Personalized High is a private school network of micro-schools. There are four Personalized High campuses and one virtual campus in total - each with between 30-50 enrolled students, hence the term “micro.” Personalized High campuses are embedded in their communities so as to take full advantage of local resources and partner with local businesses and organizations. The founders of Personalized sought to create responsive and agile learning environments designed for gifted and talented and twice-exceptional (2E) high school students.

> The mission of Personalized High School is to create spaces where gifted and twice-exceptional (GT) students all over the world are accepted, valued, and supported. We believe transformation happens through meaningful relationships built on respect and trust. Central to our culture are compassion, mindfulness and a love of learning (Personalized, 2019).

The brick-and-mortar Personalized High campuses serve students living in the Northeast region of the United States. The virtual classroom, or Cloud Classroom, serves students in all parts of the world. The concept of Personalized High was developed from

a thriving system of tutoring centers created for GT and 2E students. The vision of the founders was to offer a scaled-up version of their tutoring services that could serve more students in more locations but did not necessarily compromise on the quality of its instruction and on its focus on talent development and academic choice. Maintaining a low student to teacher ratio and capping the enrollment at each campus at 40-60 students was deemed key to this transformation. Personalized High students are meant to experience an immersive, supportive, and high-quality education that focuses on their various needs and interests. Underlying the mission and the core values of Personalized High is the idea of students thriving as they learn and demonstrating an attitude and demeanor of growth and openness to experience.

- Respect yourself and our community
- Be authentic
- Say “yes”
- Explore interconnectedness of everything
- Understand there is no one way to be
- Learn to learn anything
- Laugh at your mistakes (Personalized, n.d.)

Students at Personalized High are required to take courses in English, Mathematics, Science, Social Studies, and World Languages to progress towards graduation. They are also required to engage in co-curricular activities including Advisory, Long-term Project, Health and Physical Education, Technology, Visual and Performing Arts, and Financial, Economic, and Business Literacy. The technology requirement of the co-curricular activities is embedded throughout all of the courses. The

Advisory program is designed to provide students with social-emotional support and executive functioning development. Each school day, with the exception of Friday, begins with Advisory, which is led by Personalized High teachers. The Long-term Project is a year-long inquiry project in which students choose a topic to explore. With guidance from their teachers, each long-term project delves deeply into students' chosen areas. They develop inquiry and research questions to study. As these projects extend throughout the entire school year, teachers strive to integrate aspect of students' topics into their classroom lessons. Together the courses and the long-term projects influence each other for the benefit of students and their engaged learning. Students' courses are organized into one-hour blocks that rotate day-to-day. Schedules, therefore, vary by day of the week with the exception of Advisory, which starts each day. Fridays at Personalized High are set aside for Town Hall meetings, additional Advisory work into executive functioning and social-emotional development, creativity blocks, and time for weekly guest speakers or off-campus field trips.

The Friday Town Hall meeting are times of democratic learning and involvement where students and teachers are free to share their ideas and critiques with the goal of improving the collective efforts of Personalized High School. Town Hall meetings are structured for involvement, open-mindedness, connection, and inclusion. The creativity blocks are unguided and unstructured time for students to explore their thinking and learning in ways that may involve artwork, writing, music and video production, and other unscripted activity. The weekly guest speakers and field trips are organized by Personalized High teachers. These trips often connect with the community surrounding

each campus. In some cases, the speakers and trips may overlap purposefully with expressed long-term projects that students are working on.

> Classes at Personalized High are ability-based liberal arts classes taught by subject experts to ensure meaningful conversations, in-depth analysis, extensive experiments, and the opportunity to ask high-level questions. Talent development and academic choice are emphasized over remediating learning challenges. (Personalized, n.p.)

Personalized High maintains an active presence on most social media outlets. They provide updates on their efforts and they also provide insight and expertise into gifted education and twice-exceptionality.

Figure 4.11
Personalized High School Social Media Profile of Student Work

Participants from Personalized High School

James Reed (Administrator).

A student of business transformed into a student of social work, James, with the encouragement of his wife, a teacher, felt called into public education right out of graduate school. His journey to the Head of School at Personalized High began as a special education teacher in a local public-school district. After years as a passionate teacher and coach, James had grown close to many of his students and families. One such family had left the public system and enrolled in a new "micro" school. This was how James first learned of the newly created Personalized High. Then, later, while working in his capacity as district special education teacher, he found himself defending his school and district against a family seeking to leave the district to, like the previous family, attend Personalized High. During this process, James was told of an open position at Personalized High as Head of School. Often described by peers and colleagues as a natural leader, James, again with the encouragement of his wife, applied and was offered the position, which he eagerly accepted.

As the Head of School for Personalized High, James is an energetic presence. He is hard to miss at Personalized High - seemingly everywhere at once. Students and teachers alike know James will work tirelessly and consistently on their behalf.

Rocio Moran (Counselor).

Rocio is a Licensed Professional Counselor and Art Therapist at Personalized High School. Her background is quite diverse, having worked in hospitals in addition to schools. After some time away from both settings to focus on her family, Rocio has returned to working with the students at Personalized High. Her interest in twice-

exceptionality - especially with Autism Spectrum Disorder - led her to Personalized High, where she is an active and constant presence in the lives of her students. Her office is wonderfully inviting and calming. Students seek Rocio when they feel overwhelmed or anxious - or when they want to share their important news.

Emilia Krieger (Teacher).

Emilia has been teaching students mathematics since the 1980s. In her native Argentina, Emilia taught several levels and grades in their K-12 system of education before moving into the United States. She has a deep passion for her content area and simply loves helping her students develop their confidence and mathematical prowess. To Emilia, teaching math is teaching a different way of thinking - she thinks everyone can learn math and experience success applying math to their lives.

Emilia is a founding teacher at Personalized High. Prior to the school's inception, back when it served as a tutoring center for gifted and talented and twice-exceptional students, Emilia was one of the math tutors on staff. When the founders decided to transform the tutoring center into a network of micro schools, Emilia was first on board. Emilia has a knack for differentiating her instruction. Whether she is working with five students or twenty-five students, Emilia can personalize curriculum, instruction, and assessment to best meet the needs of her students. Her experience teaching in higher education is not lost on her students. They know she is deeply knowledgeable in all areas of mathematics and that she will work patiently with them to build trust and mutual respect - the foundations of their abilities to master mathematics.

Russell Clark (Teacher).

Russell is a hockey coach - and a writer, a reader, and a master at getting to know his students and helping them find their inner scribe. Born into a family of educators, Russell knew he was destined to teach and coach. As a young man, Russell fell in love with literature like *The Martian Chronicles*, *Lord of the Flies*, and *Animal House*. He was always reading, writing, and playing hockey. It may not be a surprise, then, that he studied Literature in college and continued to play and eventually coach hockey.

Prior to arriving at Personalized High, Russell had a distinguished career working and coaching at several independent schools. He credits his deep respect and knowledge base as key components of his ability to inspire his students. Russell gets to know his students subtly and in a way that fosters solid relationships built on trust and mutual respect. He is a collaborator and looks to partner with other teachers to ultimately engage and benefit his students.

As indicated in a survey/questionnaire and summarized in Table 4.10, the participants from Personalized High School average 12.8 of years in education. They all hold advanced degrees in education or counseling-related fields. Rocio (counselor) is relatively new to high school education. All participants years in their current positions reflect the young age of Personalized High School. Emilia is the most veteran participant having opened the school.

Table 4.10
Personalized High School Participant Demographics

Participant	Position	Years in K-12 Education	Years in Current Position	Highest Level Degree Earned
James	Administrator	12	3	Master's
Rocio	Counselor	3	1	Master's
Emilia	Teacher	18	4	Master's
Russell	Teacher	18	1	Master's

James, Emilia, and Russell all indicated moderate knowledge of gifted education, while Rocio indicated a basic knowledge of gifted education. Both teachers, Emilia and Russell, indicated they were either most knowledgeable or second-most knowledgeable about the academic needs of gifted learners. James (administrator) and Rocio (counselor) indicated social-emotional needs as their number one knowledgeable topic and academic needs as their third topic. As part of a member check, Russell explained that he chose to indicate the creation of plans to support GT learners as his first topic because he interpreted the topic as the creation of personalized and responsive activities and project. Table 4.11 summarizes the Personalized participants' self-ratings and topics they are most knowledgeable about.

Table 4.11
Personalized High School GT Knowledge

Name ***Position***	**Self-rating of the knowledge of gifted education**	**Which GT topics are you most knowledgeable about? (1 = most, 5 = least)**				
		1	**2**	**3**	**4**	**5**
James *Administrator*	Moderate	Social-emotional needs	GT law and policy	Academic needs	Creation of plans to support GT learners	GT identification process
Rocio *Counselor*	Basic	Social-emotional needs	Creation of plans to support GT learners	Academic needs	GT identification process	GT law and policy
Emilia *Teacher*	Moderate	Academic needs	Social-emotional needs	Creation of plans to support GT learners	GT identification process	GT law and policy
Russell *Teacher*	Moderate	Creation of plans to support GT learners	Academic needs	Social-emotional needs	GT identification process	GT law and policy

Personalized High School Participant Interviews

Recordings from the interviews of James, Rocio, Emilia, and Russell were transcribed and analyzed. Key comments made by each participant are summarized in Table 4.12. The comments were made in response to interview questions specific to the study's three research questions: agency, curiosity, and confidence.

James (administrator) spoke of his need to trust and advocate for his students and that his ability to do so was rooted in active listening. The micro school design of Personalized High School provides James a relatively generous amount of time to spend with his students (as compared to the administrators from Capstone and Global High Schools). Instructionally, James encourages his teachers to follow their students' passions

and lines of inquiry. He designs and iterates the school's schedule to provide the space and time for such response and differentiation. James also speaks of celebrations and sincere affirmation as key components to nurturing his students' confidence in themselves and in their learning.

Rocio (counselor) cites the school's systematic programming and structures (e.g. advisory and year-long projects) as vital to students exercising their profound curiosities. She credits the teachers at Personalized High School as the main reasons that this programming is successfully in effect for students. Rocio works personally with students to develop their social-emotional skills and self-esteem. She points out that many of Personalized High School's students were not particularly successful at more traditional schools and that their transitions to Personalized High School require targeted interventions and counseling on her part. Rocio looks forward to developing her methods across the Personalized network of micro schools and to learning from her colleagues along the way.

Both teacher participants (Emilia and Russell) discussed the importance of their content knowledge and expertise in their respective abilities to differentiate their students' learning experiences. Russell said, "I couldn't do this level of work without my subject expertise." Emilia went further, saying, "I am a mathematician and educator – I can dig into my abilities to respond to my students and provide them with a plan that we work with – together." While Russell indicated the small class sizes at Personalized High School as vital to his ability to nurture and guide his students, Emilia indicated that she has been able to differentiate in larger classes when working at other schools prior to Personalized, but that she could not adequately address the "intense needs and quirks" of

her Personalized students. “It’s very easy for me to see how gifted and twice-exceptional students can get ignored or marginalized at big schools – especially without really qualified teachers and leaders.”

Table 4.12
Personalized High School Participant Comments by Concept

Concept	Participant (Position)	Key Comments Related to Concepts
Agency	James *Administrator*	Interaction, interaction, interaction - every contact with a student is a treasure trove of information and potential I value and genuinely like my students. This truth encourages them to open up and share ideas. We’re always looking to get better at what we do here and our students’ voices matter. My interactions with my students help them let me know what’s on their minds. Part of our design here is to always say “yes,” which takes on unpredictable journeys. I love it when students realize that we listen to them - no matter how crazy the idea is initially. We built an entire engineering/physics workshop based on students’ recommendations. That not only changed the physical layout of our school, but it resulted in us hiring an expert teacher. That’s agency.
	Rocio *Counselor*	My students are able to express themselves through the medium of art. They are able to communicate their ideas in a calm and focused manner. Often what is communicated in our therapy and counseling translates into their academic work as it can inform their coursework and their teachers’ instruction. I see growth with my students as they realize that their ideas and their contributions have value here. We listen to our students.

	Emilia *Teacher*	The small size of this school gives me the time and focus so I can plan and design for each of my students. It allows me to really listen to my students and to with where they are and their interests. Many of our students come from environments where they were not really listened to or where they were bullied. Once we establish a relationship here, they open up and share their thoughts and ideas. I look for this sharing and can tailor my curriculum or what students do with their math abilities.
	Russell *Teacher*	I always look for small opportunities to listen to students and to start conversations with them about areas of interest and ability. Once we get to know each other, I find my students really open up and share what they like and don't like and what they are really into. This can often transfer into our studies - providing more entry points to learn about our content. I like to work with my students to develop ways for them to demonstrate learning. They don't all have to create the same products - we can introduce flexibility depending on students' preferred methods. They have lots of choice in this respect.
Curiosity	James *Administrator*	Teachers are given directives and the freedom to go with their kids. Lesson plans can get derailed for the sake of curiosity and questions. We can put a PhD teacher with five students to do this - it's what we're here to do.
	Rocio *Counselor*	Students' long-term projects are built around their areas of passion and curiosity. I can think of projects that are investigating stock market trading and patterns, the writings of Dante, directing films and genres of films, digital citizenship, NASA missions and future direction, and a project that is putting on a conference for students.

		All of our classes here at Personalized are flexible enough to incorporate aspects of students' ideas and questions - in addition to the long-term project. Staff and administration will always listen to students' ideas. We have an open-door policy for students. Many take advantage of this and share their thinking regarding the state of our school and their ideas to make things better for them. We like to say "yes" here.
	Emilia *Teacher*	Students work on long-term projects throughout the year. One of my students is working on weather prediction mathematical model. His goal is to develop a tool that will predict storms and hurricanes faster so they can protect lives. In addition to his work in my classroom, I am able to support his long-term project and help him understand some of the math and the statistics that will progress his project. In class, my students are always asking questions. We often begin lessons with activities that allow students to share things they are learning in other classes and in their lives and together we analyze these things to find the mathematics involved.
	Russell *Teacher*	Students will often make connections from classic literature to more modern writings, films, etc. When this happens, I can see the light bulb turn on and its instant relevance. Then they start to actively seek these connections and ask questions along the way. It's dynamic and exciting. Long-term projects at Personalized High are large, umbrella-like inquiries that permeate through the entire school year. These projects have ways of impacting students' classes. They help students learn to ask wonderful questions the simply beg investigation.

		Sometimes students will have outbursts in my class. At the surface level, these outbursts can seem rude and insensitive, but if you look at them with an eye towards communication, you can tell that they are intense forms of expression. I roll with them and try not to instantly snap back. It's a raw form of expressing interest and curiosity.
Confidence	James *Administrator*	We look for growth and point it out. This can be in academics and it can be in areas of socialization. It's important to pause and help students realize they've grown. This can be through demonstrations of learning events, presentations, or through nice conversation. Our counselor also helps here as students can often realize they're progressing and growing through their conversations with Rocio and through their art therapy.
	Rocio *Counselor*	Our students feel more confident in this space because of their history of where they've come from and that's a big conversation. Many have come from places that weren't the best for them. They may feel confident in themselves - they know they can do it, but they can lack in self-esteem. Students can lack confidence socially and wonder how they can make friends. We have activities and structure our classes to help address their social needs. I work with all of our teachers to help them guide our students in this area.
	Emilia *Teacher*	I meet my students where they are mathematically. Yes, we have course titles, but I understand the material enough to modify it to meet these needs. This is important because it allows me to customize their pathways - which, again, is an advantage of small classes. I use books, but I also use other materials, like ACT problems, SAT problems, problems from all areas - and we can always go

		outside or on a trip to see math in action - to start with the application of math and work backwards to the underlying theory and such. We have a lot of freedom, which helps me respond to my students, which really helps them become more and more confident in their abilities.
	Russell *Teacher*	My students write a lot and keep journals. They share so much when they do this. I think confidence is the ability to just write and put their thinking down on paper. I must maintain a current and deep knowledge of literature, which helps me tend to my students writing - both in its mechanics and its style. One of my most reluctant writers, at least initially, is now writing a book about being himself - it's a book about growing up autistic. I'd say he's grown confident as a writer and as a learner.

Observations of Personalized High School

Rather than a class or a program within a school, Personalized High Schools is a school entirely designed around supporting and nurturing GT and 2E students. As a micro-school network, each Personalized High campus enrolls approximately 40-60 students, which allows for classes of one to ten students. The classrooms are mostly along the perimeter of the school building. A generous central hallway and open area is created as a result. Nooks and crannies adjacent to classrooms provide areas for students and teachers to quietly read, relax, and discuss. Most of the classroom areas are bordered by bookcases and decorated industrial office cubicle-style walls that can be moved if and when necessary. The spaces appear highly modular and flexible - as if the entire layout of the campus could be changed in a matter of hours.

Figure 4.12
Areas of Personalized High School

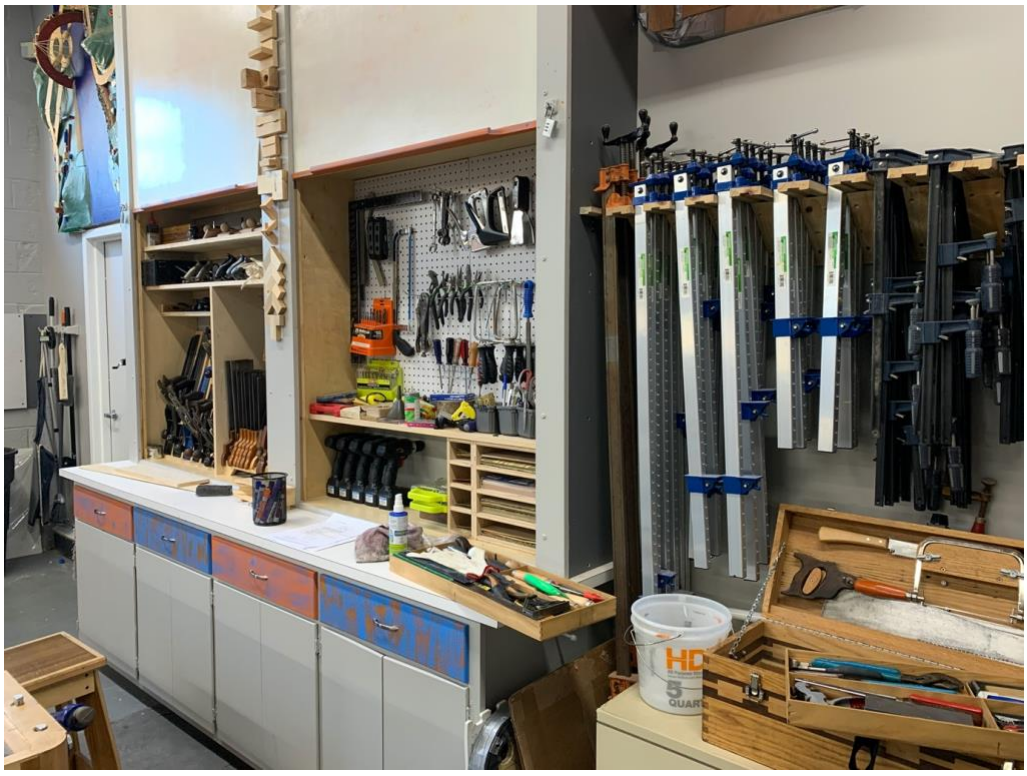

Room 4

Personalized High School starts its day at 9:00am - later than more traditional high schools. The beginning of the day is a time of profound focus laced with a noticeable sense of purpose and determination. The building wakes with its students and staff as classes begin and the sounds of learning discussions replace the groggy and muffled sounds of movement and polite, yet terse, greetings. The sounds of a power saw and hammering draw me to the school's workshop, in which six students, ranging from 9th to 12th grade, and a teacher are working on the construction of catapult-like devices as part of a combined physics and engineering class. The workshop is a space of application, creativity, and concentration. The teacher circulates the space and interacts with his students. He fields their questions, but always redirects them to their plans,

drawings, and notes. He is careful not to provide answers to questions if he knows students can answer quickly themselves - he saves his expertise and guidance for areas of novelty and safety. The workshop is part garage, part carpentry shop, part metal workshop, and part tool shed. A strip of yellow tape on the floor delineates space where technology is welcome and where it is not. The teacher is determined for students to use their laptops, tablets, and phones as amplifiers rather than metaphorical crutches that inhibit their original thinking. He tells me that not allowing these devices in the shop is part safety and part active engagement. He has seen students interact more with each other, him, and their plans and notes since implementing the technology-free zone rule.

Intermittent with the sounds of tools are the comments and questions or students regarding torque, force, angles, tensile strength, measurement, accuracy, and construction time as students work in pairs to construct their kinematic trebuchets and catapults. The atmosphere feels busy and focused - and calm and resolute.

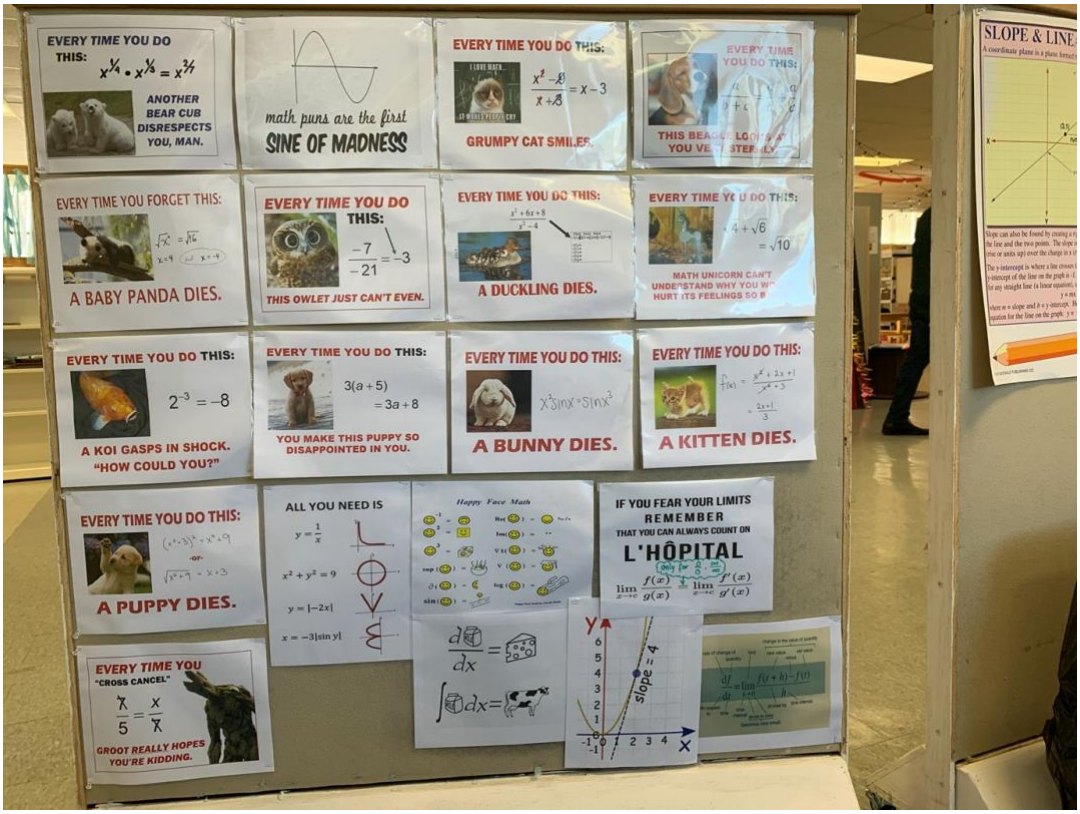
Figure 4.13
Workshop at Personalized High School



As leave the workshop and walk down the main hall, a student approaches me and tells me all about the book he is writing. “It’s a book about my life and what it’s like growing up gifted and autistic.” He goes on to describe to me how every one of his teachers, from his math teacher, science teacher, to certainly his English teacher, are helping him with his project and how they always seem to integrate it somehow into their respective classes. “Well, got to go - time for a discussion about Philosophy. Have a nice day!” Then he turns and walks down the hallway in the opposite direction.

Students and staff adhere to a daily and weekly schedule of courses, lunches, exercise, and advisory groups. Emilia’s math courses happen in a small office-like space with two tables. It is barely large enough for half a dozen students.

Figure 4.14
A Peek into Emilia’s Personalized High School Math Classroom



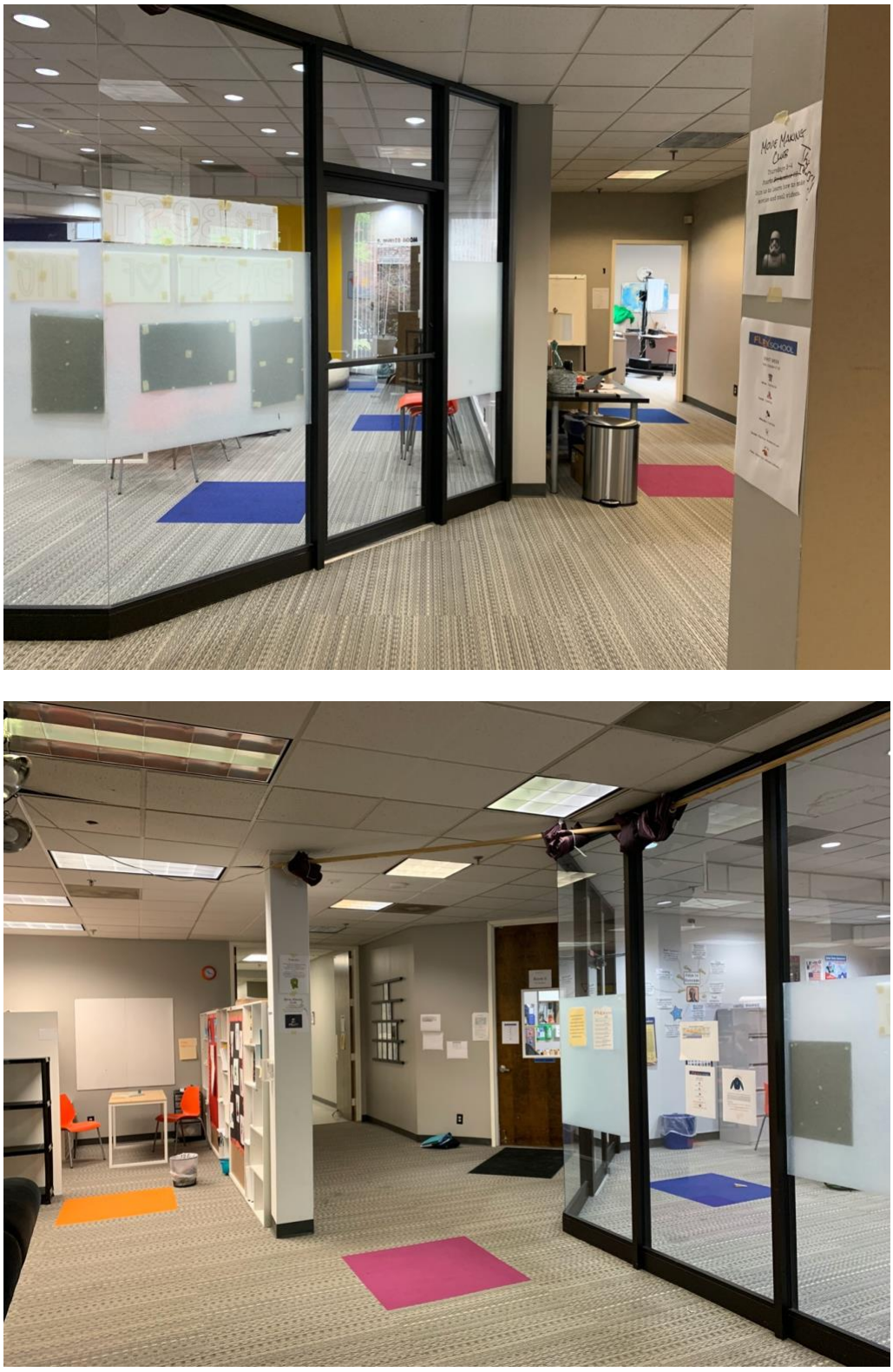
In it is a large screen that is used for in-person instruction and as part of the Personalized High's Virtual School. Emilia teaches students all over the nation and world. This particular class has four students who, according to Emilia, are at different states of understanding Calculus. She presents them with a prompt adjusted from an SAT exam and asks each student a different question and to work on an aspect of the problem that is consistent with her understanding of their needs. Students take turns explaining their thinking and methods of solution to the group - accepting questions as they do so. This continues for several cycles. The conversations are lively and spirited. The students and Emilia seem quite comfortable with this approach - the questions from the high school students, who range in age from 12 to 16, extend into questions of application and relevance. They want to know why this information is important and how it may be used beyond class and test questions. They agree as a group to strive to apply their work to

their year-long projects as they share. One student connects his work to the recent stock market fluctuations and changes - another student talks of "sling-shooting" a rocket around a planet to accelerate its velocity in route to its destination further in our solar system. Through it all, Emilia listens and facilitates the conversation. She points out to them how far they have come in this method of sharing, reminding them that she once had to take a more assertive role where now she is able to facilitate to keep the conversation "relatively on track."

On my way to Russell's classroom, I look into Rocio's office window. She is in session with three students. One student is drawing on a large art pad. Another is painting. Both seem content in their activity and intensely focused. The third student is facing Rocio and the two of them are in a conversation. They both wave to me as I walk past - the student smiles at me.

The Fishbowl is near Russell's classroom. I peer into its floor-to-ceiling glass walls and see four students and a teacher. They are all in separate areas of the class and are reading various sections of the New York Times print newspaper. I find out later that they are reading current events to share with each other and then watching the day's CNN-10 news report to analyze the stories for accuracy and consistency. "News," the teacher tells me, "must be scrutinized and our students suggested we take time to do just that." Students spend time every day or every other day doing so - practicing skepticism as one student described the activity.

Figure 4.15
The Fishbowl Classroom at Personalized High School



Russell's eight students were spread out in his classroom area. They were reading books like Dante's Inferno and several works of Shakespeare. Russell met with each of his students over the course of an hour and reviewed their recent journal entries. His feedback is personalized to their writing - he offers commentary regarding what it felt like to read their writing and what he was thinking as he did so. He has a gentle and reassuring method - one that students seem to crave as they then respond with questions of their own. "How did you feel the moment you finished reading?" asks one student. "What did you find yourself wanting to read immediately after reading my thoughts on the topic?" asks another. As the class ends, I realize that there was another student who was just outside the classroom, reading while seated on one of the couches. I ask Russell about the student and why he was not active like the others. Russell tells me the he is doing a slightly different project regarding Dante's writings and that they will meet online in the virtual classroom later that afternoon.

Classes at Personalized High School are each connected by subject and topic, but the specifics of each student's work vary according to their needs, interests, and - in some cases - moods and energy levels. Though conversations in each class may vary slightly from student to student, they all seem to know and understand what each other is investigating relative to their own work. It is a community and collective of learners. Occasionally, sounds from a nearby classroom may carry into another due to the modular design of the walls. Students practicing speaking in Spanish with each other and with their teachers are introduced to several excited and animated comments about Greta Thunberg and climate change and about whether or not young Greta writes the speeches she gives. Sometimes conversations are animated and loud with disagreement and

teachers respond with pleas for quiet and focus. Other times it's clear that the animated and loud voices are the teachers as they rise to meet their students' levels of passion and interested. Personalized High School is a dynamic environment. Its students and teachers seek interaction with each other, even when they are merely walking from one side of the building to another to use the restroom. Sitting in a chair that is located in the middle of the campus, I can hear that most of these conversations relate to projects and to global and world issues. One student approached me to share the food blog he maintains on his website and peppers me with questions about menu design and my own food preferences. Personalized High School seems to amplify and overtly encourage students' giftedness and twice-exceptionality.

Some Lunch and Kickball.

The kickball game is in full effect as I walked through the back doors, the same back doors that served as front doors when I walked through them my first time visiting the school. Several Personalized High School students are arranged in some semblance of sporty organization on a field of mostly grass that is flanked by large trees. Though it is tough for me to tell where the infield ends and the outfield begins, the students seem to know what they are playing and the general objective of the game.

It's a blustery afternoon – the occasional gust of wind reminds me that a rainstorm is expected. I stand next to a table where the newly hired science teacher is sitting enjoying his sandwich. Between bites he tells me about his days, which include time teaching at Personalized High and teaching as an Adjunct Professor at a local university. He is quick to remind me that he has a doctorate in chemistry - but cannot tell me if he enjoys teaching his college students more than his high school students – or the other way

around. He loves working with both levels of his students. “You know,” he laments, “the students here usually ask such deep and profound questions. There’s no way I could do what I do with them in a large class. I am getting used to my classes of two and three students.”

A loud yell draws my attention back to the game, where an argument or an intense disagreement – I can’t tell which - is taking place at second base. The second baseman is telling the base runner that the drops of rain that he felt a moment ago were neither real nor imagined, but rather, he believed, perceived. The base runner, without missing a beat, said, “Ugh. Epistemology!” Just then as the ball was kicked to right field. The base runner took off running towards third. As she rounded third base and headed home to score, she yelled back to the second baseman, “I prefer Physics!”

*****

The three teachers who sat to my right were discussing their work and their students. “I think he’s doing great - and he’s realizing that he can be himself here,” says one teacher. “I agree,” says another teacher, “I’ve seen students get confident here – they start to trust us and the other students.” I find myself nodding in agreement just as the kickball hits me in the upper chest - and a student yells, “That’s in bounds!”

Figure 4.16
Lunchtime Kickball at Personalized High School

Summary of Personalized High School

Uniqueness abounds at Personalized High School. The school's mission indicates its primary focus is to create spaces to accept, value, and support gifted and twice-exceptional students all over the world. They also state that meaningful relationships are foundational to this effort. Their mission, and their design as a micro school, has allowed Personalized High School to implement and maintain a response school-wide curriculum that encourages both its teachers and students to explore a broad range of subjects - often in an interdisciplinary manner. It also affords students the ability to develop their social-emotional and executive functioning skills as Personalized's staff is highly attuned to monitoring and nurturing these skills in classrooms and in the school's dedicated weekly time to focus on such work. Classes at Personalized High School are differentiated - mostly by process and outcome - based often on students' expressed needs and interests. While some classes at Personalized High School can operate like small tutoring sessions, curricular documents have been developed to provide a greater opportunity for a systematic approach to its mission across its various campuses. The virtual classroom and courses offered through Personalized High School extend the reach of this network. Teaching students virtually who live across the United States and the world will continue to challenge Personalized High School to create curriculum and learning experiences that engage learners across cultural and academic barriers.

The year-long project is designed to scaffold students' questions into a body of evidence that communicates the students' growth to parents and community members. The growth is also meant to impact the students themselves and their teachers as the

project topics and methods to influence classroom work and apply many of the social-emotional and executive functioning skills addressed throughout the year.

James (administrator), Rocio (counselor), Emilia (teacher), and Russell (teacher) all indicated the intensity of working at Personalized High School and how this intensity mirrors that of their students. They all find their students' intensities and passions endearing and challenging. These thoughts also extend to many of their students' parents and families, who - over the years of their children's educations - have learned to assertively advocate for their sons and daughters and who, over many years, exercise methods of extreme parenting to support their children's learning endeavors and to combat apathy, withdrawal, and underachievement. With respect to twice-exceptionality, Personalized High School strives to identify and nurture students' gifts and talents - while attending to any identified learning inhibitors or disabilities.

According to Personalized High School's Principal, James Reed, the network of schools is "on to something," and will continue to expend and open new campuses to educate more gifted and twice-exceptional learners.

Emergent and Overarching Themes

To describe the ways Capstone, Global, and Personalized High Schools nurture the agency, curiosity, and confidence of their respective gifted and talented students, a descriptive case study research approach was employed. Descriptive case study is an appropriate method when the aim is to identify characteristics, frequencies, trends, correlations, and categories (Creswell & Creswell, 2018), which aligns with the purpose of this study: to explore high school learning environments designed to maximize the agency, curiosity, and confidence of gifted and talented and twice-exceptional students.

The three research questions that guide this study each ask *how* the respective learning environment nurtures agency, curiosity, and confidence. Twelve educators from the three high schools participated in this study. Each was interviewed using two interview protocols (Appendixes C & D) and observations of the learning environments were conducted (Appendix E), which provided a body of data consistent with the study's research questions.

Interviews were transcribed by hand to allow for maximum opportunity to absorb and study the data. Observation notes and school documents and artifacts collected from school visits were similarly reviewed and studied. Notes and brief responses to the information were made - which were grouped first by site and then together according to similarity. Steps of inductive analysis were employed. These included an initial analysis of the data by thoroughly reading the transcripts and observation notes and annotating and writing margin notes, coding the transcripts by highlighting the text and identifying key words and phrases, and using the codes to develop categories. Describing these categories created an initial list of emergent themes. Summaries of interviews containing quotations related to agency, curiosity, and confidence were sent to participants for their review and comment. Their responses and feedback were incorporated into the creation of a list of five emergent themes for this study: Connected Technology, Structured Questioning, Appreciation of Intensities, Interdisciplinarity, and Gradual Release.

Connected Technology

The use of technology at Capstone, Global, and Personalized High Schools is ubiquitous, yet not one school made mention of any specific platform or tool that they use for all of their work. Students and educators at each site use what they can to accomplish

the task at hand. Most often, this task involves sharing their work as part of seeking feedback, communicating progress, and displaying their work. Shared "live" documents that afford users the ability to allow other stakeholders to directly comment and edit were popular and clearly evident. The ability to connect to a projector or screen to display their work in a more public manner was also noticed. Global High School's Futurology classroom has several monitors throughout the room and in near by areas that students connect either wired or wirelessly to enhance their discussions. In these events, the display is hardly mentioned - it is used to amplify their work without itself becoming the center of the students' and educators' attention.

Virtual classrooms and websites were used at all three sites. They serve as online "hubs" to connect students and educators - and to allow for communication and interaction well outside of the time limits imposed by scheduled classes. Many of these were accessible via phones and apps and were used in this manner. Each site also utilized virtual conferencing technology to connect with community partners and experts throughout the world. Personalized High School relies on such connection to conduct its virtual classrooms for its global learners. In all cases, however, platform used is not the primary focus, but rather the purpose of the technology as a connector. The use of cloud-based technologies at Capstone, Global, and Personalized was ubiquitous in nature, but not distracting in use.

Structured Questioning

All three sites rely and encourages students' questions and contributions - input and feedback. Each participant, regardless of title and role, discussed procedures in place to work with their students and their ideas and questions. Counselors utilize procedures

by which they can listen to students and tell them what they are hearing. This is particularly important for multi potentiality and gifted students who may often hear from others what they are good at and what they should do or study. The social-emotional lens by which the Capstone, Global, and Personalized High School educators apply is one that adds dimensionality to students' growth and maturation. Students at these schools are encouraged to think beyond their academic development and into a balanced sense of self. This, in classrooms, is taught and modeled by employing techniques by which students' questions and inquiries are brought forward and shared with other students and educators in ways that focus on the questions and topics more than the person sharing them. This helps remove any internal judgement that can inhibit social contribution in the classroom.

The techniques employed in the classrooms and with students' projects add structure to the classes. The structure is often understated and not overt, but, when present, provide students with boundaries and expectations by which they bring forth their curiosity. Students in Global High School's Futurology class learn to comfortably participate in sessions designed primarily to generate questions that may be investigated. These sessions often follow a form of media, like a video or image. Providing answers is not permitted during these sessions. As the course progresses, so do these sessions. They develop more refined questions that may drive research. To refine the questions, students share with others in iterative and critical ways. They begin to think of their questions as working questions, which, according to Ken (teacher), "provides a student a sense of draft that allows them to relax into the process."

The process at Capstone High School - in their GT/Honors Academy - is similar to that of Global, but it is lengthened over a longer period of time, which provides time for students to include academic reading that can be used to support the need for their inquiry and thus more originality in their work. Students spend time in individual consultation with their Junior Colloquium teacher and with other students. They learn to express their ideas and seek response and critique. All of this, according to David (teacher), "is fun to observe and participate in as students get so confident with their thoughts and in their budding research methods." Adding structure to questioning activity encourages students to exercise agency in ways that add to their growing confidence in themselves - all the while directly addressing their curiosity.

Personalized High School, even more so that Capstone and Global - due to its whole-school model, encourages questioning through the use of its physical learning spaces. Their spaces are highly flexible and can be adjusted to accommodate the needs and demands of classroom activity. Their wall space is rich with student work and material and art that provoke thought.

Appreciation of Intensities

According to Daniels & Piechowski (2008), gifted children exhibit rich intensities and sensitivities that deserve to be understood and affirmed instead of squashed. Either as a result of training or natural disposition, or both, Capstone, Global, and Personalized High Schools all embrace the various intensities, interests, and quirks of their gifted and talented and twice-exceptional students. This acceptance helps create an environment of trusting relationships where listening is active and focused. The teachers, counselors, and administrators that participated in this study all mentioned enjoying the interesting nature

of their work and discussions with their respective students. Counselors acknowledged the challenge and rewards of supporting students who honestly share their mindsets and questions with them - there was satisfaction in identifying opportunities for these intensities within the broader systems of their schools. Personalized High School is entirely built to support such flexibility. Their micro school nature and more systematic understanding of the nature and needs of gifted and twice-exceptional learners creates a responsive and informed environment.

Lynn Mewis's vision for the GT/Honors Academy was written as thesis for her master's degree in gifted education. She actively recruits and trains educators to work with the school's GT students. This results in a cadre of educators in the GT/Honors Academy who appreciate the intensity and asynchrony of their students - and, just as importantly, feel equipped to encourage their students to exercise agency over their learning and to ask their meaningful questions not only as research questions, but as conversational questions as well.

Interdisciplinarity

The student projects in Global High School's Futurology course, Capstone's GT/Honors Academy, and Personalized High School's year-long project often synthesize two or more academic disciplines and draws knowledge from several fields. Futurology is a combined Science and Social Science course. Students in Futurology earn credit in both subject areas depending on the work they do and share as they investigate their research questions and solutions. The course is co-taught by teachers from each discipline, which promotes an interdisciplinary approach to all of the course's activities.

The GT/Honors Academy culminates in the research project that is most directly addressed during students' junior and senior years - in their Colloquia courses. Though they are awarded English credit for their efforts, the students research topics and questions most typically involve disciplines and subjects that are traditionally taught separately in high schools. Students, therefore, are applying knowledge they gained in previous classes and they are learning new information as they engage their projects. Educators in the GT/Honors Academy help students connect with community partners and subject matter experts when and as needed throughout their work. Further, according to the educators involved in both programs, the interdisciplinary nature of their students' problems is advantageous when they are sharing their work with their communities and audiences during exhibition of learning events.

Personalized High School is an entire school designed for the purposeful collision of various academic disciplines. With educators of different disciplines teaching in such close proximity to each other and spending time together, it is inevitable that their awareness of each other's endeavors will overlap and impact classroom instruction and learning. This is also the case as students are not limited to coursework by age constraints. Younger students can be in classes with older students, which mixes ideas and thinking. The year-long projects at Personalized tend towards the questions at both Capstone and Global and are therefore interdisciplinary in nature. These projects will, according to Emilia and Russell, influence the conversations and learning activities within more specific courses. Lastly, near constant contact with school administrators (like James) and their counselor (Rocio), students are invited to share their project progress with a broader audience, which can also lend to more interdisciplinary

approaches to maintain effective communication and interested audiences and stakeholders.

The GT students in Global's Futurology, Capstone's GT/Honors Academy, and at Personalized High School tend to ask research questions that naturally overlap academic disciplines. Many are drawn to global issues of significance, like climate change, that do not solely adhere to one discipline.

Gradual Release

Capstone, Global, and Personalized High Schools have all developed techniques and approaches to scaffolding students through research and inquiry projects. In doing this, the role of the teacher and staff changes throughout the process. They must assume less directness in their roles as students assume more ownership over their work and growth. This gradual release is most pronounced in Global High School's Futurology course, where the happens over the course of a semester (which meets 90-minutes a day). Capstone's gradual release occurs over the course of its four-year program and accelerates over the last two years during the junior and senior colloquia.

Key to this type of gradual release is a system of constant and expected sharing of progress to obtain feedback. Students, according to all participants, are not used to sharing their work like this for the sake of sincere and actionable feedback. Kristen (counselor) at Capstone High School addressed this directly when she said that she supports students as they go through as "conversion" of sorts and begin to experience learning autonomously - and with fewer external pressures.

The gradual release described at Personalized High School is more nuanced. It happens in classrooms and throughout students' year-long projects. The latter being

similar to what occurs at Global and Capstone High Schools. The gradual release in Personalized's classrooms may happen less predictably and according to students' motivation and perceived mastery of the material, which is all rooted in the trusting relationships that are a focus of the school's mission. In action, the gradual release in Personalized's classrooms may look like differentiation, but it is better explained as manifested student agency and confidence within responsive and accommodating curricula.

All of the participants made mention of their need to adjust the directness of their roles as students assume increased awareness and ownership of their learning. David (teacher) at Capstone made specific mention of this as a "release." The gradual release is a transformation rather than a disappearance. As they gradually release through the programming, they assume roles that are less daily and direct, but just as vital.

Summary

This chapter organized and detailed the data collected from three different schools participating in the case study. Demographic and baseline data from a written survey/questionnaire, participant interviews, and observations of the learning environments designed to investigate the concepts of student agency, curiosity, and confidence as they relate to gifted education were analyzed according to each site and to each of the participant's respective position as administrator, counselor, or teacher. The analysis of the data identified five themes consistent with the efforts of each of the schools described in this study: Connected Technology, Structured Questioning, Appreciation of Intensities, Interdisciplinarity, and Gradual Release. These themes were each described and will be expanded upon in the next chapter, which explains the

significance and potential application of this study, additional areas of research and needs of further research, and details a theoretical model and a practical model that may, in conjunction with the findings of this study, suggest a sustainable model of high school gifted education that may best engage gifted learners in a time of increasing sophistication, globalization, and uncertainty.

CHAPTER FIVE: DISCUSSION AND IMPLICATIONS

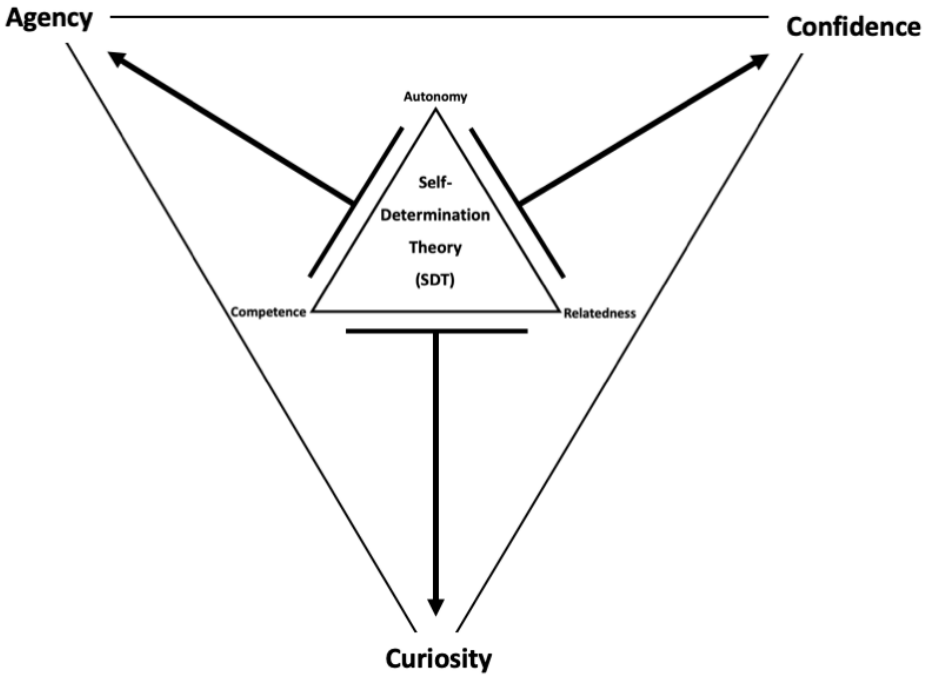
Options for gifted and talented high school students are dominated by accelerated programming like Advanced Placement and International Baccalaureate (Hertberg-Davis & Callahan, 2008) and extracurricular activities mostly associated with academic competition (Omdal & Richards, 2014). This study was conducted to describe high school learning environments that maximize students' agency, innate curiosity, and confidence. It investigates three high schools that aim to do just this. One school is entirely designed around this purpose. It is a small leaning environment that calls itself a "micro school" (Personalized, 2019). It is a collective network of campuses specialized for GT and twice-exceptional (2E) learners, many of which were not successful or happy while enrolled in their neighborhood public schools.

A second site has designed and implemented a vertically aligned program for its gifted learners that affords them opportunities to learn and research with mentorship and community partnership. Students scaffold their inquiry over their high school careers and are supported by expertise in the realms of academia and social-emotional counseling (Capstone, 2018).

A third site offers a GT-clustered Advisement program and several specialized courses to its GT students. These courses are interdisciplinary and co-taught. They are designed are accepted best practices of inquiry-driven learning and gifted education (Global, 2017).

Models like Renzulli's SEM and variations of Betts' Autonomous Learner Model have been successfully implemented over the years since their creation, yet neither has achieved any form of wide-spread acceptance as gifted programming in high schools (Renzulli, 2012). Studying and analyzing programs by utilizing a theoretical framework consisting of the tenets of Self-Determination Theory: autonomy, competence, and relatedness has identified themes that span all three of the sites studied (Reeve, 2012; Ryan & Deci, 2017). These themes exemplify the concepts of agency, curiosity, and confidence. They may very well code for characteristics of sustainable and wide-spread programming for high school gifted learners. The model in Figure 5.1 depicts the relationship between autonomy, competence, relatedness and learner agency, curiosity, and confidence.

Figure 5.1
Relationship of SDT and the Conceptual Model of Agency



The model maintains that agency is manifested from autonomy and competence by virtue of students' ability and empowerment to make decisions regarding their learning at systematic and individual levels. These decisions are themselves grounded in their students' competence and knowledge of subjects and skills. The model also maintains that curiosity grows from competence and relatedness. Tending to relationships in learning environments - amongst students and educators - creates fertile ground for sincere inquiry - as a form of applied and extended competence. We ask what we have learned about, are learning about, and want to learn about. Expertise and environment guide the curiosity into fruition as connections of personal impact are made working the minds of individual learners. Confidence, in turn, is manifested autonomy and relatedness. Again, relatedness and relationships can safely guide students as they exercise their influence over learning trajectories. Educators expertise is invaluable as students grow academically and emotionally. Knowing when to metaphorically push, when to pull, and when to stand aside are keys to serving relevant roles in the lives of GT students (Kanevsky, 2017, 2011; Prain et al., 2018).

Nature of this Study

The purpose of this study was to explore and describe high school learning environments designed to maximize the agency, curiosity, and confidence of gifted and talented learners. It was a designed as a descriptive case study around the following three research questions:

1. How does the learning environment nurture the agency of gifted and talented secondary students?

2. How does the learning environment nurture the curiosity of gifted and talented secondary students?
3. How does the learning environment nurture the confidence of gifted and talented secondary students?

In describing these learning environments, emergent and key themes were identified as similar to all three of the high schools in this study. Such similarity may inspire the design and implementation of modern and engaging high school programming for gifted and talented learners. Efforts in high schools must include more than accelerated coursework meant to replace college-level courses (Hertberg-Davis et al., 2006). Best practices in gifted education can, as this study describes, be effectively implemented in comprehensive high schools and in districts large and small.

Descriptive case study methodology allowed for thick description of agency, curiosity, and confidence from the perspectives of administrators, counselors, and teachers - each of which had valuable perspectives of educating gifted high school students. Case study also allowed for a multi-site approach, which adds impact and adaptability to the study by identifying and discussing the themes common to all three sites despite their various programming options.

Emergent Themes and Agency, Curiosity, and Confidence

The themes identified in this study that were consistent to the three sites were Gradual Release, Interdisciplinarity, Appreciation of Intensities, Structured Questioning, and Connected Technology. The concepts of student agency, curiosity, and confidence, as founded in the autonomy, relational, competence tenets of Self-Determination Theory, were deductively compared to the descriptions of each of each theme. The result of this

was how each theme sorted amongst the concepts of agency, curiosity, and confidence. The following sections further describe each theme according to the learning environments at Capstone, Global, and Personalized High Schools. The figures within each of the next sections depict the agreement of agency, curiosity, and confidence according each theme. A visual of black fill ■ indicates the most agreement and a visual of diagonally striped lines ▨ indicates the second most agreement of the three concepts.

Gradual Release

The theme of gradual release arises as teachers, administrators, and counselors enact procedures that transition their respective actions in response to their students increasing levels of confidence and there demonstrated progression and demonstration of increased agency within and over their learning. Matt and Ken, teachers from Global High School, describe this as they reflect on their students' work in their Futurology classes:

> Matt: A sort of intellectual momentum increases as they move from their question development and into investigation and towards a potential solution. We shift as we help and support and guide. It's sort of like a painter stepping back from the canvas from time to time before touching up his or her painting.
>
> Ken: It's an exponential, nonlinear process. The students' excitement takes off after a period of a sort of grinding and struggling to find their topics and develop their questions. I have to adjust, or risk really being run over by their excitement and their pacing. At this point their confidence is being realized and they own their work. I help with their management and in addressing content needs. We see

so much in this class and hope it can translate into other classes and, really, into the students minds from here on out.

Students and educators designing, implementing, assessing, and debriefing together as a process of co-creation are keys to highly engaged learning environments focused on students' autonomy and agency (Kanevsky, 2011; Reeve, 2012; WCGTC, 2019). Morgan, an administrator from Capstone High School, described her efforts to master schedule to create the time and space for her teachers to a … as a "systemic effort to create a sense of flow within the GT/Honors Academy," so that seniors in their Colloquium class can "completely own and can speak to their learning."

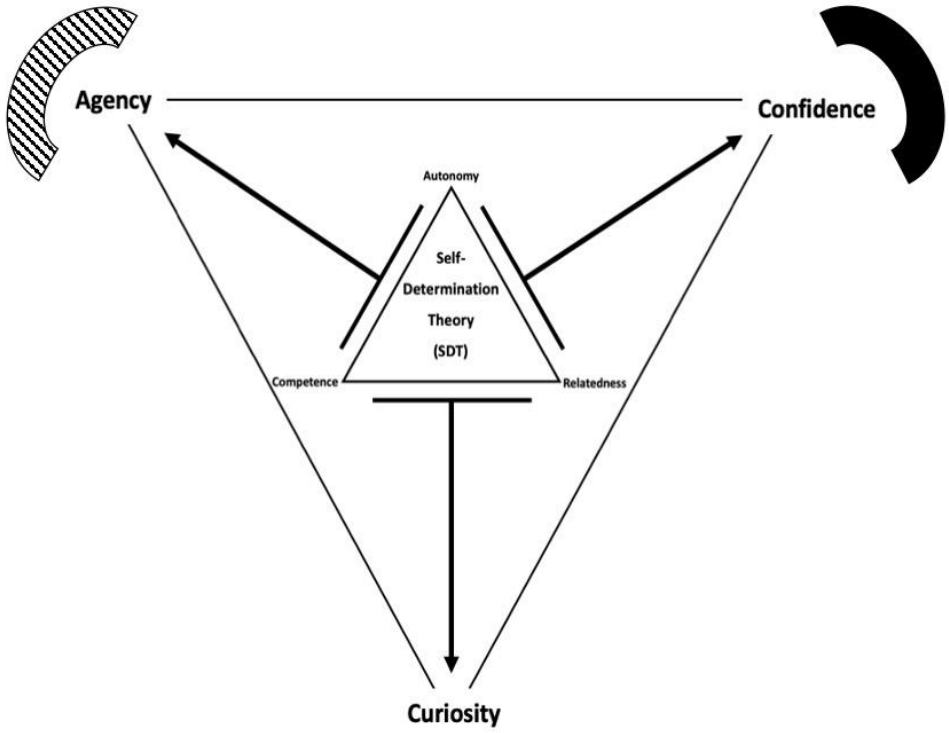
David, teacher from Capstone High School, talks of experiencing the process of gradual release as "confidence in action as agency happens." He describes the process as "empowerment for both the student and the teacher," which suggests a sense of the co-creation described by Kanevsky and Reeve. Unlike Global High School's Futurology course, the scaffolded GT/Honors Academy program at Capstone High School unfolds over a four-year period. This longer period of time affords Capstone educators the ability to witness students' growth in confidence and exercised agency. Kristen, the Capstone High School GT counselor, says she can attest to this growth in her students that participate in the GT/Honors Academy:

> The conversations and sessions I have with my Academy students focus on a higher level of development and confidence. The students talk about extensions of their work in their Colloquium classes. They can experience deeper satisfaction along the way. Issues we work through are more internalized and understood by

these students - less about what was done to them and more about what they can do about things.

James, administrator from Personalized High School, agrees, “They grow to realize that they own this place - this is their work and we respond to them.”

Figure 5.2
Gradual Release as Agency and Confidence



Interdisciplinarity

Of the learning environments studied, only the Futurology course at Global High School is set up as an overtly interdisciplinary structure. As a combined science (Global Science) and social studies (Contemporary World Issues) experience, Futurology asks students to address pressing global issues like climate change, government processes, resource use and depletion, migration, and others. Conversations regarding the work and

learning happening in Futurology often extend into some of Global High School's other GT structures, like their clustered advisements. GT students who choose not to take Futurology for reasons of scheduling conflicts and issues of time commitment, will "live vicariously through another student's work," according to Scott (administrator at Global High School). The interdisciplinary nature of the questions in Futurology both creates popularly engaging questions of study and reflects the types of questions students, especially GT students, are inherently interested in working to answer. Single disciplines do not often encompass significant expertise and breadth to address truly global issues - such issues require collaboration across disciplines (Ambrose, 2016).

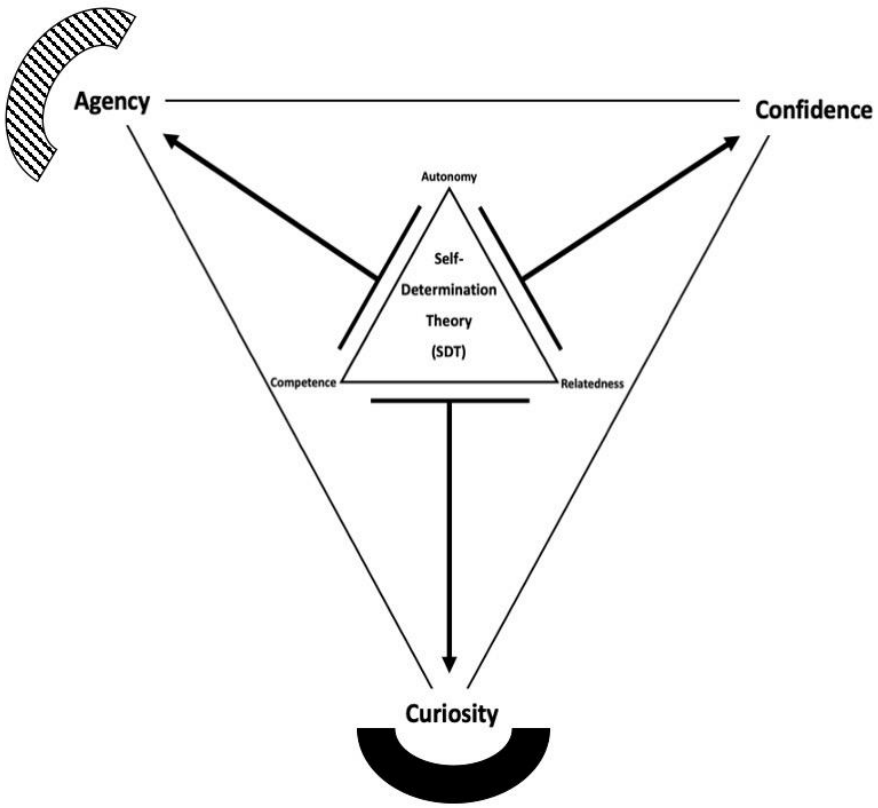
Interdisciplinarity at both Capstone and Personalized High Schools directly stems from the types of issues that students choose to investigate and the research questions that they develop to do so. Students' choices of topics and questions agree with Ambrose. Emilia (teacher at Personalized High School) describes her school's year-long projects as "windows into gifted students' souls" as students are given the freedom to explore their natural inquiry - often times, as Rocio (counselor at Personalized High School) describes, "questions they have been growing up asking themselves - and looking into themselves over the years." Global, Capstone, and Personalized High Schools not only encourage, they expertly demand, that their gifted students share their questions and their thinking with others.

The innate curiosity is gifted learners is guided by the educators in these programs and by interdisciplinary study (Spencer & Juliani, 2017). The interdisciplinary nature of the work is attributed to the potential impact and relevance of this expressed and guided curiosity. Futurology at Global High School contains and bounds their work within the

broad disciplines of natural science and social science - as such boundaries reflect the disciplines of the teachers of the course. The projects at Capstone and Personalized High School know no such limits. Their teachers, due to increased time, can work with students across more disciplines and work with students to make connections with discipline-specific experts as necessary.

In each program, students' investigations into their interdisciplinary questions demonstrates agency and ownership of their learning endeavors. Lynn (teacher at Capstone High School) describes what she witnesses as students share their work with each other as "a higher level of learning because the ideas that students research overlap in so many ways."

Figure 5.3
Interdisciplinarity as Curiosity and Agency



Appreciation of Intensities

"I don't understand my students, I over-stand them."

(James, administrator at Personalized High School)

Diction matters, and when James says that he "over-stands" his students, he means it. James said this to several students when they pulled him aside in the main area of Personalized High School and when they freely entered his visible office area.

> Our kids are unique - they can think through things differently and express themselves in quirky … coded ways that I always find so fascinating. Our day-to-day conversations never get old. They can be real here and be themselves. All of the teachers and the staff here go with this and work to bring it into their teaching as they get to know their kids and their abilities and interests (James, administrator at Personalized High School).

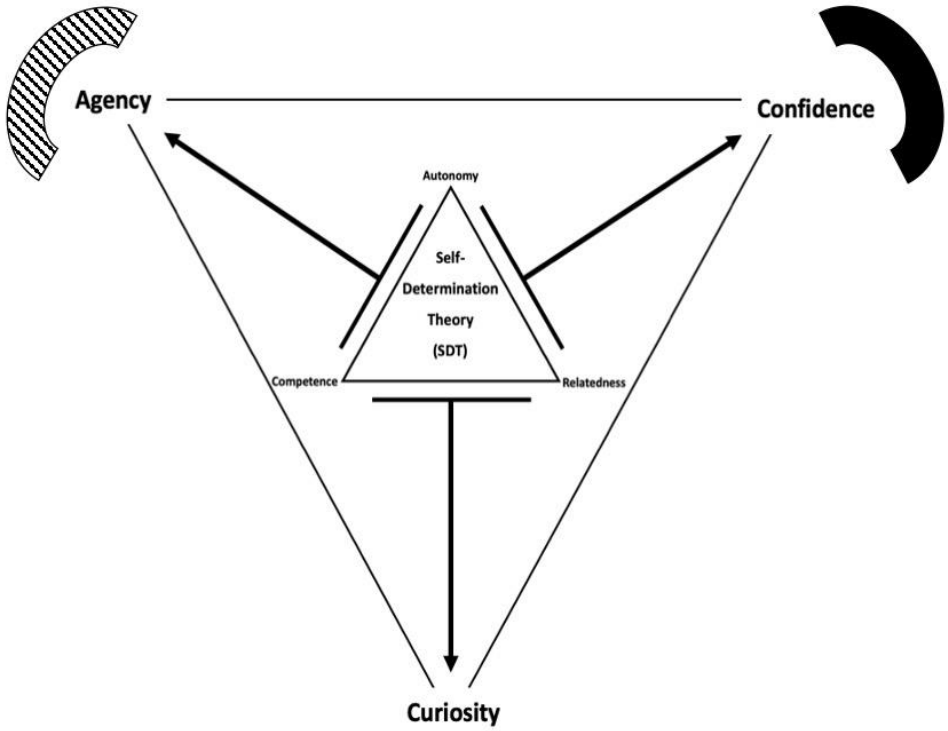
The educators in this study all communicate with and actively listen to their students. Student after student would approach them and walk away from them often nodding and smiling or with a look of resolve and focus - they know they were heard and that their exchange was valuable. The interactions seemed to visibly add to the confidence of each of the participants - students and educators. "Every conversation, every interaction - verbal or nonverbal … every collision with students is an opportunity, says Ken (teacher at Global High School). David (teacher at Capstone High School) agrees, "I am doing this work *with* my students. Their highs are my highs and their lows are my lows. We're honest with each other - and I get and truly appreciate the intensity of it all." Armed with confidence, gifted and talented students at Capstone, Global, and Personalized High Schools are free to take action on their diverse interests and build on

their intense drive and being. They "unmask" according to Aaron (counselor at Global High School) which "tells them they can share their ability rather than taming it."

As students grow confident in their abilities and progress, they will demonstrate increased agency over their learning. "They grow assertive in their own ways - no matter how introverted or extroverted, there's a buzz about them that is hard to miss if you're tuned to their frequency," says Russell (teacher at Personalized High School). The teachers, counselors, and administrators from Capstone, Global, and Personalized High Schools have all participated in some form of training or workshops designed around the needs of gifted and twice-exceptional learners - with Personalized High School having received the most direct form of this training (see Tables 4.3, 4.7, and 4.11). The educators at Capstone High School have benefited from Lynn Mewis, who has supported her staff over the past years and provided them with support regarding strategies and best practices to incorporate into gifted education. Global High School participants have participated in sporadic workshops and trainings - increasingly from district personnel but have largely created learning environments based on educator personality and philosophy. That the participants from Global High School appreciate and build on their GT students' intensities and interests is mostly a testament to their individual and collective openness to experience and their desire to learn and challenge themselves.

Though the preparation of the educators involved in this study may vary, the learning environments they have created for and with their gifted students are safe for sincere student input and contribution. They have developed systems and practices to build on intense contribution and personality.

Figure 5.4
Appreciation of Intensities as Confidence and Agency



Structured Questioning

"All the knowledge we have is a result of asking questions; question asking is the most significant intellectual tool human beings have. Is it not curious, then, that the most significant intellectual skill available to human beings is not being taught in school?"

(Neil Postman)

Capstone, Global, and Personalized High Schools all utilize techniques of questioning to engage their students and to help them discover and formulate their inquiry questions. In doing so, all three sites are addressing students' inherent curiosity and inner wonderings. Personalized High School does so in its individual classes to both enhance the students' learning experiences through relevance and the co-creation of

activities by students and teacher. They also design around student curiosity throughout the school's year-long project work, which often address broader and interdisciplinary questions. Russell (teacher at Personalized High School) enjoys Socratic discussions with his students. In facilitating these discussions, Russell works to ask probing questions of his students to "activate their minds and voice." He then likes to transition the discussions in to time for students to generate their own questions that fall within the boundaries he has set forth for the lesson of study. Russell continues:

> I play an active role in this process to guide the questioning. They ask and follow up on their own questions, but I am essential to making sure these questions are within the realms of our focus and study. It can appear effortless from the outside, but I assure you, I am engaged and very active as it all unfolds. I work exclusively with gifted and 2e students and their thinking can be nuanced and busy - and they really build upon each other and each other's questions. Our methods guide this all - otherwise it would be rather chaotic.

The GT/Honors Academy is a vertically scaffolded program within a comprehensive public high school. Kristen (counselor at Capstone High School) notices as her GT students who participate in the Colloquium classes accept ownership of their work and their projects, saying,

"We often discuss the differences from one class to the next. Students notice their lack of input and power in other classes as they progress with their research work." David (teacher at Capstone High School) goes further into this increase in student ownership and agency:

> Schools can hold GT kids back - the reason they can't pursue their passion and curiosity is because they are so busy jumping through hoops. So much of what we do in high school is about teaching kids that what they're interested in doesn't matter … Our classes aren't unstructured free-for-alls. We use structure and mentorship to take ideas and fit them into the big picture. This shows them that their passion and curiosity are not unrelated to their academics.

Teachers and educators play critical roles in guiding students to transform their curiosity and questions into action by helping them identify their questions, focusing their inquiry, challenging their research methods and encouraging their ability to manage their workloads and overall projects (Zion & Slezak, 2005). According to Deci & Ryan (1985) and Ostroff (2012), this is all best achieved when educators themselves are curious, self-directed, and open to experience and trying new things. Not only is this true of the educators who participated in this study, but it is also true that they all believe they play vital roles in unleashing the ability of their gifted students. Emilia (teacher at Personalized High School) sums this up when she says, "We talk a lot about schooling versus learning. Letting students be curious makes them engaged and less passive, which changes everything we do together."

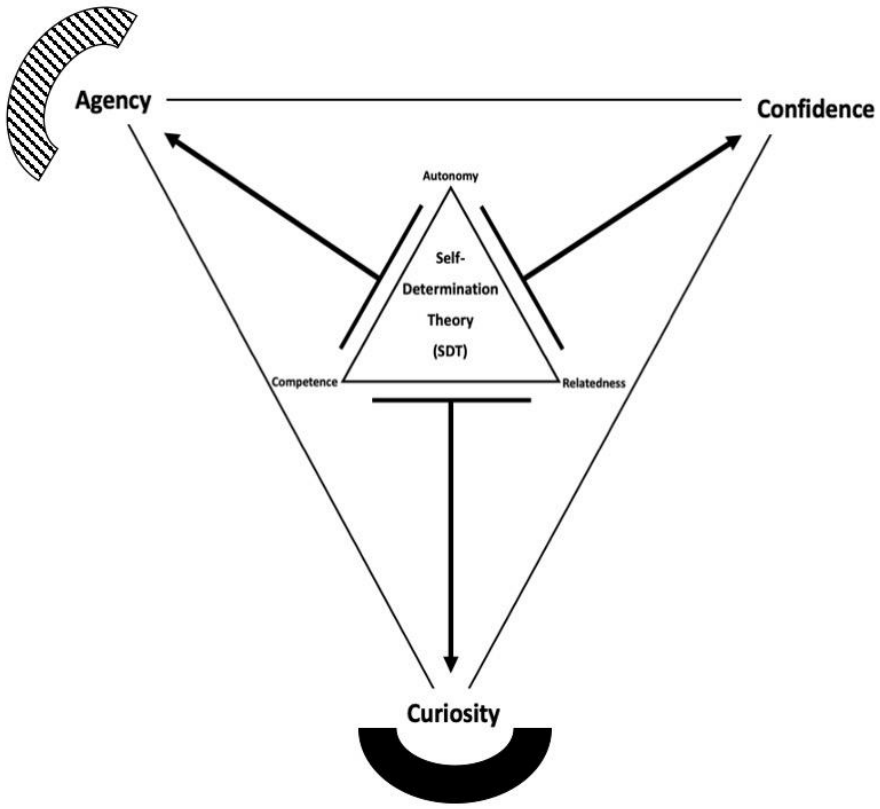
Educators at Global High School, as observed in their Futurology class, which is typically comprised of 20-35% GT students, utilizes a method inspired by the Question Formulation Technique (QFT). The QFT was developed by Dan Rothstein and Luz Santana (2011). It involves steps that begin with a focus theme (eg., artificial intelligence, designer babies, modern democracy, etc.) that generates questions from a small focus group of students. The list of questions is revised and edited by changing closed

questions into open questions and the resulting questions are prioritized according to importance, relevance, and interest. The ultimate step in the QFT involves a group discussion of the prioritized questions. Ken and Matt (teachers at Global High School) utilize versions of QFT as they guide students to writing their own questions to investigate. During this process, students tell Ken and Matt how they begin to notice and critique their other classes. “It can sometimes create an unbalance and struggle for them,” says Matt, “they can struggle with having so much agency in our class and then switching to more expected compliance and silence in other classes.” Aaron (counselor at Global High School) agrees with Matt when he says that he often works with his GT students on what they can control and influence in their classes once they begin to experience more ownership, “Students are unleashed, which is excellent, it’s what we want, but they also begin to see other areas of education less favorably, but we address that from a strengths-based perspective and by setting goals.”

What students experience is biological. Dopamine surges in our brains when we are curious. These surges improve the function of our hippocampus regions, which enhances our long-term memory and overall learning experience (Gruber et al., 2014). Structured questioning addresses students′ curiosity, which then nurtures and maximizes their agency. Techniques, procedures, and protocols to discover, formulate, and investigate students’ questions are key drivers in accomplishing this. Capstone, Global, and Personalized High Schools are witnessing what can happen when gifted students are guided and encouraged to contribute their curiosity - actively, consistently, and purposefully - rather than randomly and serendipitously. Neil Postman (1979) addresses curiosity and questioning in schools as follows:

> All the knowledge we have is a result of asking questions; indeed … question asking is the most significant intellectual tool human beings have. Is it not curious, then, that the most significant intellectual skill available to human beings is not being taught in school?

Figure 5.5
Structured Questioning as Curiosity and Agency



Connected Technology

While the experience of a ubiquitous form of technology might at first connote the exploration of curiosity, it's the connectedness afforded by the technology that emerged as a theme. This connectedness contributes to students' agency and sense of confidence. Matt (teacher at Global High School) has used the term "platform agnostic"

to describe his and his students' experiences utilizing connected technology to amplify and share information and media with each other and to seek input and feedback. "It doesn't matter what tool or platform, or product we use," he said, "as long as it accomplishes what we need it to do." While the Futurology course content is supported by Google Classroom because, "It's free and available and it works," Matt says he and Ken could use a different product "in a matter of days" if needed. This commitment to the effect of connectivity rather than a commitment to a specific technology permeates the learning activities in Futurology at Global High School, in the GT/Honors Academy at Capstone High School, and in the entirety of Personalized High School - the latter includes the school's Virtual School component, which connects students and teachers from all over the world.

> By not focusing on technology we end up focusing on what the use of technology can convey in terms of learning. It's as if we give our students the ability or the freedom to bring into school what they spend their time exploring outside of school. My students, especially my GT students, bring in their laptops and they open them up and show that they've started their research a long time ago, maybe years ago – it was just on their own time. It's as if they're sharing their diary with us. I'm glad they can bring it into our class. (Ken, teacher at Global High School).

Students in these various learning environments create shared documents that can be viewed and edited by others and presentations via websites, videos, podcasts, and slide shows almost constantly. In Russell's Personalized High School classroom, students were sitting only several feet away from each other and connected to their mutual work as they worked collaboratively on their laptops. Provided access to several mounted screens,

students at Global High School would project their work onto the screens and form a spontaneous meeting to review material. There were no side conversations regarding how to use the screens or whether or not to use the screens in this manner, rather a slight pause as the student who was sharing her research into the topic of modern democracy realized that a larger visual and a change in the way she was presenting to her peers would be beneficial in accomplishing her task of "updating the others as other progress and to seeking their feedback regarding the clarity of her explanations," according to Ken.

In the GT/Honors Academy at Capstone High School, students and teachers often create documents for the purpose of reflecting and communicating the progress of the research being conducted as students experience the Junior and Senior Colloquium classes. Frequent sessions in which students update each other and their teachers regarding their practice reference the content of these documents, as presenting students seek to practice sharing their progress and seeking instant feedback and ideas or suggestions from each other.

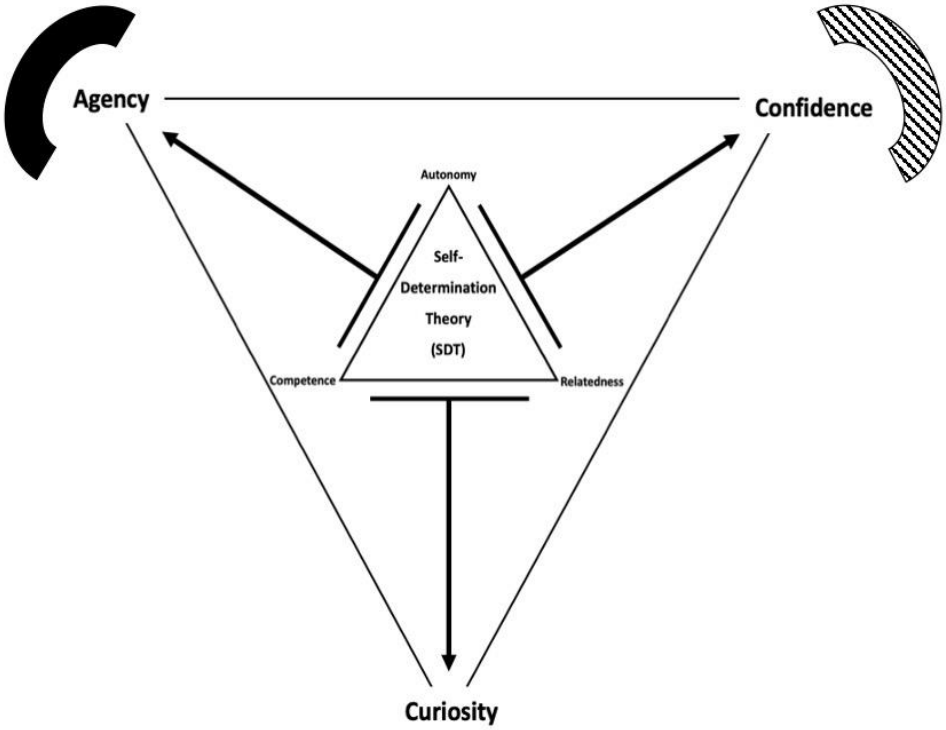
The use of technology in this fashion is a driver of student agency. It empowers them to not only seek, identify, and consume a vast amount of available information, but also to share and amplify their work is useful, effective, and collaborative ways. It adds independence and freedom to their explorations and an "anytime anywhere" to their ability to demonstrate their ways of knowing and their inquiry processes (Kettler, 2016; Mehta & Fine, 2019; Richardson, 2015, 2019).

Aaron (counselor at Global High School) utilizes connected technology with his GT students to extend their ability to communicate with each other. Often in the form of shared documents, he and his students will transform a blank document into a "canvas,"

as he calls it, that can convey a tremendous amount of information regarding the student's learning experiences. He and the student will often toggle back and forth on this document to dig deep into an idea that may inform a student's schedule of classes, on a relatively large scale, to methods of classroom assessment, on a relatively smaller scale. It's in the exploitation of the connectedness afforded by modern technology that most of the educators in this study say both demonstrates and catalyzes students' levels of confidence in themselves and in their abilities to share their thinking with others and seek input and feedback regarding their work.

While the use of technology as a driver of making and constructing in the sense of engineering, design, and building was evident at Personalized High School, most often observed in their workshop, science, and engineering spaces, it was the technology as a connector, amplifier, collaborator, and contributor that was most evident in the learning environments described in this study.

Figure 5.6
Connected Technology as Agency and Confidence



Another way to synthesize the emergent themes of gradual release, interdisciplinarity, appreciation of intensities, structured questioning, and connected technology is by assigning a numerical value of 3, 2, or 1 according to which of the agency, curiosity, and confidence concepts overlapped with each theme in Figures 5.2 through 5.6. A score of 3 corresponds to a primary overlap (black fill), a score of 2 corresponds to a secondary overlap (diagonally striped), and a score of 1 corresponds to a tertiary overlap (neither black fill nor diagonally striped). Summarized in Table 5.1, this analysis shows the concept of student agency was most common to the themes. It also shows that all three concepts were each within one point of the average value of 10 and thus distributed evenly amongst the five themes.

Table 5.1
Values of Agency, Curiosity, and Confidence and Themes

	Agreement Score (3 = highest agreement)		
	Agency	Curiosity	Confidence
Gradual Release	2	1	3
Interdisciplinarity	2	3	1
Appreciation of Intensities	2	1	3
Structured Questioning	2	3	1
Connected Technology	3	1	2
Total Agreement Scores	11	9	10
Average Agreement Score		10	

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"Nothing endures but change." (Heraclitus)

Of the following themes that emerged in this study, namely, Gradual Release, Interdisciplinary, Structured Questioning, Appreciation of Intensities, and Connected Technology, one in particular stands out as particularly vital when considering our modern world: Connected Technology. Evident in this study was the purposeful and functional use of technology to share, amplify, and create. As such, technology contributed to students' agency and control over learning. Form followed function, which afforded students the possibilities of extending their investigations and learning either beyond a single subject or discipline - or deeply within a subject or discipline, or, in some cases, both.

Students and educators learn together in an age of ubiquitous knowledge that is often retrievable at our fingertips and at the speed of light. The pace of change, whether invited or not, is accelerating. The gifted and talented students at Capstone, Global, and

Personalized High Schools know this and are actively investigating many aspects and results of this constant change. The questions they investigate through their projects and coursework and conversations with their counselors tend to revolve around ideas of great import to society and, at times, beg an existential tone with regards to the progress and trajectory of humanity and our world. Joseph Renzulli (2016), the architect of the Schoolwide Enrichment Model, puts it as such:

> Today's world is a much different place than it was when out of the theories that guide today's education system were developed. The only thing that has remained constant is change … to move forward with new ideas we must consider change within the larger context of creativity, globalization, technology, and the interdisciplinary nature of knowledge. Creativity, globalization, technology, and what takes place in the larger world affects every one of us every day and that is a good thing. We all live on the same planet and we all have a responsibility to contribute our gifted and talents to making this small planet a better place.

The examples provided by the students and educators at Capstone, Global, and Personalized High Schools are glimpses into what can be accomplished in the name of gifted education when attention is paid to nurturing students' agency, curiosity, and confidence. Students turn their minds and their potential towards issues and problems that press the whole of humanity and that do not have simple solutions. The educators at these schools are creating learning environments that extend beyond more typical accelerated course options like Advanced Placement and concurrent and dual enrollment. Their efforts are much needed on behalf of gifted and talented high school students. High schools, after all, are not meant to simply serve as highways to postsecondary education. Students can accomplish more than building transcripts that lists courses and grades - they can contribute and create along the way. Their journeys should matter as much, if not more, than a constant focus on a next hurdle or a next school.

Globalization and Modern Learning

Modern learning adds to the promise of progressive inquiry-driven models by infusing connected technology. It also creates more opportunity for interdisciplinary and transdisciplinary synthesis of traditionally isolated subjects and skills.

The past several decades has seen remarkable change and growth in all areas of society, culture, lifestyle, and communication. (Freeman et al., 2017; Kettler, 2016; Mehta & Fine, 2019; Richardson, 2019). Speed-of-light technologies have connected and networked populations or, quite literally, as in the case of the Global Positioning System (GPS) and satellite communication, enveloped us and our planet in a vibrant web of connected nodes that does not stop at terrestrial borders or oceans. This global connectivity has altered every aspect of human existence - gifted education notwithstanding. The challenges facing the 21st century are substantially different from the challenges facing any previous century (Sternberg, 2016). The implication of the descriptions and analysis of this study provide drafts of blueprints that can help build modern learning environments for gifted high school students. These environments can supplement, enrich, or replace current accelerated programming. Gifted high school students can apply their knowledge and focus on relevant and pressing - they can contribute solutions to relevant and pressing issues and opportunities.

The "Catch a Wave" model proposed by Don Ambrose (2016) visually and dimensionally depicts the impact globalization on society and education over a period of time. His model describes 21st-century trends that include *macroproblems* and *macro-opportunities*. Macroproblems are global, high-impact, long-term, transdisciplinary challenges and difficulties that threaten harm and devastation to the lives of billions of

people and all of life on the planet (Ambrose, 2016). These macroproblems are global due to the international nature of their influence and spanning of borders. They cannot be solved by a single nation. They are described as long term because they have originated from years (decades and even centuries) of neglect, corruption and absolute and dogmatic thinking. They are transdisciplinary because no single subject area or discipline contains enough expertise to fully research and address their potential solutions - doing so requires collaboration across disciplines. Macro-opportunities, by contrast, are the novel and unprecedented circumstances that can catalyze advances in health and well-being for billions. Table 5.2 contains examples of macroproblems and macro-opportunities.

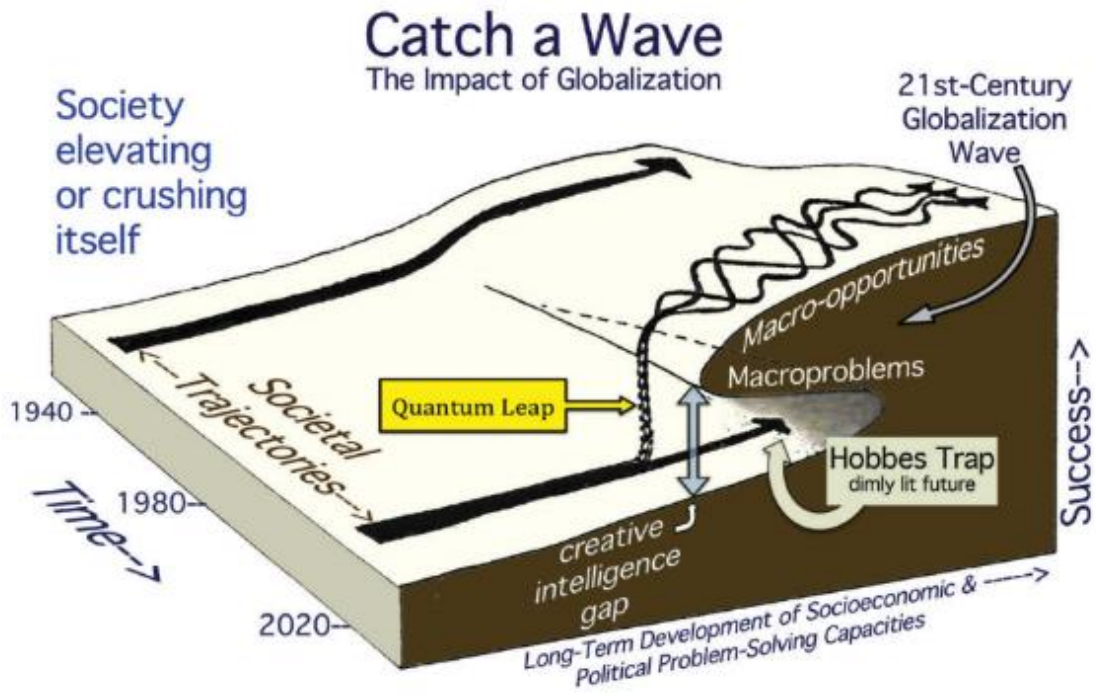
Table 5.2
Examples of Macroproblems and Macro-opportunities (Ambrose, 2016)

Macroproblems	
Resource depletion	Looming shortages of hydrocarbons, minerals, fresh water, and arable land (Daly & Farley, 2010; Friedrichs, 2013).
Environmental devastation/climate change	Pollution-aggravated impacts on global climate are manifesting in the power and frequency of high-impact storms worldwide, which creates unfavorable conditions for the biosphere (Friedrichs, 2013).
Erosion of democracy	Ideological polarization creates extreme policies and the deception of the citizenry and an erosion of civil rights (Bermeo, 2003).
Socioeconomic inequity	Growing divide between a small number of powerful plutocrats and the majority of impoverished and exploited citizens (Daly & Farley, 2010).
Dangerous dogmatism	Narrow-minded and superficial thinking contributes to inhibited creativity increased misconception, and pervasive recklessness (Ambrose & Sternberg, 2012; Granik, 2013).
Macro-opportunities	
Exponential knowledge growth	Advances in information technology and scientific networking are spurring knowledge growth in many areas creating enormous gains in knowledge bases (Motta, 2013; Zander & Mosterman, 2014).
Cognitive diversity	Transdisciplinary collaboration is accelerating innovation due to research teams with diverse ideas and perspectives (Suresh, 2013).
Scientific and artistic networking	Emergent online crowdsourced projects have led to solutions of previously unsolvable mathematical and scientific problems due, in large part, to contributions from artistic fields (Nielsen, 2011).

Figure 5.7 is the "Catch a Wave" model. The left side of the model signifies the passage of time. The top surface of the model represents society or civilization advancing through more or less effective economic, sociopolitical, and cultural initiatives. The vertical dimension represents societal success and achievement. Globalization has changed the surface from one that is relatively calm and flat to an imposing and crashing wave that requires a "quantum leap" to rise above into macro-opportunity and success.

Absent this leap, the model depicts the inner area of the wave as a "Hobbes Trap," wherein macroproblems are crushing, like a wave, which creates a dark future for humanity. The "creative intelligence gap" separates the devastating macroproblems from the enlightened macro-opportunities. Addressing and bridging this creative intelligence gap requires courageous leadership and inspired development.

Figure 5.7
The Impact of Globalization on Societies (Ambrose, 2016)

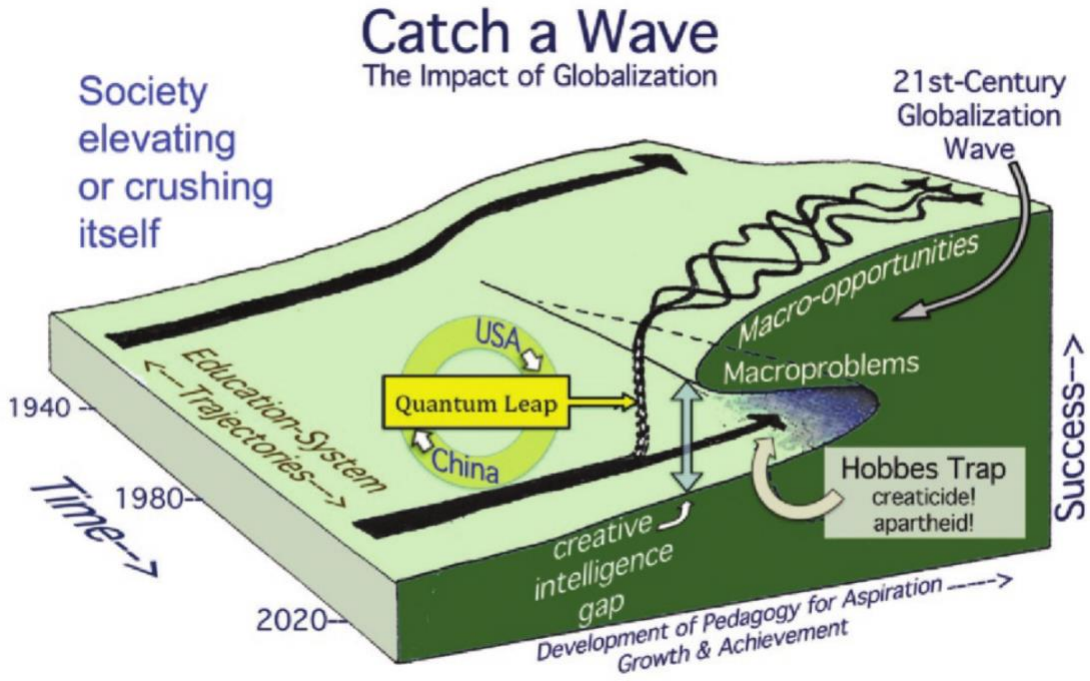


Waves are dynamic transporters of energy. The Catch a Wave model depicts energy as globalized movement that has grown in intensity and power into a wave that can be metaphorically crested by society or that will crush society. Ambrose has also created a modified Catch a Wave model that is specific to education (see Figure 5.8).

The educational Catch a Wave model replaces economic, sociopolitical, and cultural initiatives with the development of pedagogy for aspiration, growth, and

achievement. The dark left to right arrow, therefore, represent attempts by educators to create educational philosophy, curriculum, and instruction that enables students to aspire, achieve, and ultimately succeed in their adult lives (Ambrose, 2016). The language of the Hobbes Trap in the educational version of the model relates to the concepts of "creaticide" and "apartheid." Creaticide represents a perverse and systematic inhibition of creativity in education (Berliner, 2012). Apartheid is a purposeful term mean to represent the result of dogmatic pressure that is pure on school systems to impose more testing and "robotic instructional methods while cleansing them of higher-order thinking" (Ambrose, 2016). This imposed pressure creates extreme inequity within the broad system and results in privileged elite school experiences for an elite few and accountability-laden, deprived school experiences for many more. The educational Catch a Wave model also includes a visual representing the trajectories of the United States and China. China, as depicted in the figure, is rotating in the direction of the upwards quantum leap. The United States is depicted as rotating down and into the crashing wave of globalization. According to Yong Zhao, China is working to revamp its "excessively mechanistic, noncreative, accountability-driven educational model and align it more with the creative, constructivist, student-centered approach found more frequently in American classrooms" (Zhao, 2014).

Figure 5.8
The Impact of Globalization on Educational Systems (Ambrose, 2016)



The educational Catch a Wave model depicts the development of pedagogy for aspiration, growth, and achievement. This study explored learning environments that maximize students' agency, curiosity, and confidence. While not necessarily the same concepts, there is overlap in so much that focusing and maximizing these concepts nurtures students towards excellence and contribution. Though the learning environments at Capstone, Global, and Personalized High Schools were developed separately and unaware of the Catch a Wave model, they all afford their gifted students the opportunities to make "quantum leaps" over the metaphorical wave and towards to macro-opportunities. By appreciating their students' intensities, using connecting technology, and enacting methods of gradual release, structured questioning, and interdisciplinarity,

the educators at Capstone, Global, and Personalized High Schools are nurturing their students towards individual and collective excellence.

Study Limitations

This study was a descriptive case study. The purpose was to make the unfamiliar familiar to others by focusing on depth and detail (Hamilton & Corbett-Whittier, 2013; Yin, 2018). It was not designed to evaluate, rather to provide detailed descriptions of three high schools and their programming efforts on behalf of their gifted and talented students. The three sites met the criteria of the study but were identified as possible sites of study primarily due to the presence of their educators at conferences, on gifted education committees, and from suggestions from professional and academic colleagues. A thorough and national or global search for high schools that have implemented programs and programming options to maximize student agency, curiosity, and confidence would undoubtedly yield more than three potential participating sites - most private and independent high schools and some public high schools.

Teacher participants at Capstone and Personalized High Schools were identified by convenience. These two schools employ more than two teachers who are involved in aspects of their gifted education programming. Priority was given to Lynn and David at Capstone, as they are founding teachers in the school's GT/Honors Academy. Emilia and Russell at Personalized High School were suggested by the school's administration and leadership based on their different perspectives as Math and English teachers. Other teachers at Personalized High School expressed interest in participating, which would have changed a convenience sampling method to a snowball method.

All three sites were visited over a two-month period of time. A longer period of study may have provided additional details regarding the progress of projects and more resolved answers to the research questions in the study. Also, for reasons of time constraint, the study did not include parent and student participants, which would certainly add tremendous perspective and valuable input and data.

Future Research

The area of secondary gifted and talented education - especially high school gifted and talented education - is ripe for further and future study. This is especially true when considering aspects of modern learning that are consistent with globalized and connected approaches. This study included administrator, counselor, and teacher participants. Each position offered somewhat unique feedback. The administrators were key in creating the time and space for their school's respective GT programming. They also sought resources in the form of funding allocation and professional development. Counselors - especially those trained as gifted education specialists - describe their focus on the intensities and unique social-emotional needs of their GT students. They report the need to merge academic promise with emotional development to nurturing gifted learners. Teachers with propensities to methods of deep learning, and who themselves have contextual knowledge of their respective areas of expertise and who naturally seek overlap and harmony with other areas and subjects, create relevant learning environments for and with their students. This is a masterful practice that is highly structured to ensure freedoms for students. Any one of these areas and these positional participants deserves further research and study. While this study includes all three types of participants, future

studies may focus on each type of participant. Evaluative case study, narrative, or phenomenology may be appropriate methodologies to extend these studies.

Additional and future study may include longitudinal methods. Studying one or all of the sites in this study over the course of three to five years will identify impact and successes in contextually appropriate ways. For example, college and career transition and progress quantitative metrics and qualitative descriptions can demonstrate the potential righteousness or deficiencies in the approaches and efforts described in this study. Educational connoisseurship and criticism study could describe, interpret, and evaluate any of the sites included in this study over a six-month to one-year period of time. Such a study could focus on the complexity and discerning qualities of the implemented programming designed to maximize the agency, curiosity, and confidence of gifted learners.

Districts are creating programs accessible to students from each of their district high schools, these students are not limited to site-based offerings. These programs are designed to provide students opportunities to collaborate with community partners in learning career-specific skills like aviation, computer programming, architecture and design, manufacturing, and aspects of financing and managing businesses (CCSD, 2019, PSD, n.d.). Other district programs like the Iowa Big Ideas Group are similar in how they serve district-wide high school students, but instead focus on developing students' ideas into useful and practical community-focused solutions (Iowa BIG, n. d.). These programs are not specifically designed for GT students. Future studies can investigate district-level modern programming options and their appropriateness for gifted education. Such studies can ask and investigate the question of how districts centrally organize and provide

learning opportunities that maximize gifted students' agency, curiosity, and confidence. These studies could be case study or potentially quantitative in design.

Aspects of this study can be used to create a model of online enrichment courses. This model would describe niche and specialized courses offered synchronously at the district level and taught by a cadre of adjunct instructors from the district's various high schools. Thus, teachers of gifted and highly motivated students would not be limited to students enrolled at their respective schools. They can teach students across their district. Future research could develop such a model.

Organizations like Battelle for Kids have created networks of schools and school leaders who are committed to providing students modern learning opportunities that "innovate and partner with its networks, association and business partners, and school system leaders to design and implement educational experiences that prepare all students to become lifelong learners and contributors in an ever-changing world" (Battelle for Kids, n. d.). Aspects of this organization's work overlap with the macro-opportunities and macroproblems of Ambrose's globalization model (Ambrose, 2016) and potentially with the student agency, curiosity, and confidence framework of this study, but are not expressly specific to gifted education and the nuanced needs of gifted learners. A pilot study could investigate whether the concerted efforts of this organization and of its partnering high schools are potentially advantageous for gifted high school students in lieu of accelerated programming like Advanced Placement courses and therefore worthy of further study.

Other areas of future research can expand on the themes identified from this study. This study built upon the tenets of Self-Determination Theory (SDT), namely,

autonomy, relatedness, and competence. It applied these tenets as the concepts of student agency, curiosity, and confidence and identified five themes consistent to the three participating high schools: Gradual Release, Interdisciplinarity, Structured Questioning, Appreciation of Intensities, and Connected Technology. School and classroom-level intervention consistent with these themes could be studied at high schools. These participating high schools could be urban, suburban, and rural and could include gifted identification data sensitive to community and school demographics. As such, these studies would be similar to those that have investigated issues of efficacy and equity of Advanced Placement programming and courses. Are courses and programs incorporating these themes more accessible, sustainable, responsive and effective at meeting the needs of diverse populations of students? Research built on these themes would develop tools of observation, interview, and document analysis to triangulate collected data. These tools could be further developed and utilized as a potential model for program design and evaluation.

Additionally, further study into a vertical articulation of the themes that emerged in this study (as rooted in agency, curiosity, and confidence and SDT) would include the middle school and high school levels. Systems that include elementary magnet schools that matriculate the majority of their GT students into a consistent middle school and then high school could serve as potential sites for aspects of qualitative and quantitative study. Networks of schools like Denver School of Science and Technology (DSST, Middle and High School) and Renaissance Expeditionary Learning Outward Bound School (Elementary) and Renaissance Secondary School (RSS, Middle and High School) are

examples of potential Colorado schools that could serve as potential sites in a study a vertically-aligned methods meant to maximize student agency, curiosity, and confidence.

The participants of this study were high school administrators, counselors, and teachers. They completed surveys, were interviewed, and directly observed interacting in their respective learning environments with colleagues and with students. Students were not participants in this study. A need for any future study investigating student agency, curiosity, and confidence is for student participation and voice. While any of the aforementioned areas of future research could be conducted with adult educators, future research into maximizing student agency, curiosity, and confidence via the themes identified in this study should include gifted and talented students. Areas to investigate include school and program culture, competing interests within the schools, and the ways in which students support one another, and the dynamics of their student to student and student to teacher relationships.

Closing Thoughts

The purpose of this study was to describe high school learning environments designed to maximize agency, curiosity, and confidence of gifted and talented and twice-exceptional learners. Each site explored in this study maintains programming specific to these concepts. Consistent emergent themes of Gradual Release, Interdisciplinarity, Structured Questioning, Appreciation of Intensities, and Connected Technology were common to each site's programming and offerings. These themes may serve as descriptors and blueprints for the design and implementation of modern gifted high school programming. Global High School demonstrates how this can be accomplished by designing and offering courses designed to maximize student agency, curiosity, and

confidence. Capstone High School does this via a vertically aligned, four-year academy structure that is offered to its gifted students. Personalized High School is a micro-school that is completely designed around the concepts of student agency, curiosity, and confidence. High schools can apply the themes and ideas presented in this study to create learning environments that nurture gifted learners and develop their potential in highly relevant and applicable ways consistent with the problems and opportunities afforded by continued globalization and networking.

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A Note Regarding "The Great Pause" and Global Pandemic

As I write the closing thoughts to this Dissertation in Practice, our world is gripped by what the President of the United States calls an "invisible enemy" (Trump, 2020). A pandemic caused by severe acute respiratory syndrome corona virus 2, or SARS-CoV-2, or simply coronavirus has spread across the globe and is responsible for tens of thousands of cases of the impactful respiratory illness called coronavirus disease 2019, or simply COVID-19. Right now, thousands of businesses, K-12 schools, and universities across the United States are shuttered to face-to-face interaction. They are relying on online versions of their products and services that are delivered to individuals' places of residence. The global spread of COVID-19 represents a true macro-problem delivered by the wave of globalization. Efforts to slow the spread of COVID-19 represent humanities first attempts to control and alter the spread of a pandemic disease. In essence, these attempts represent a "quantum leap" over the wave of globalization en route to the discover of macro-opportunities in the forms of vaccines and novel approaches to health care and disease.

As a consequence of our current efforts to alter the spread of coronavirus, all students, gifted students included, are learning at home via efforts of remote learning facilitated by students' schools and their teachers. These efforts – and how long they are in effect – may demonstrate to students and to educators alike that personalized and differentiated strategies to employ ideas like the themes of this study may liberate the thinking of gifted learners to learn as they address global macro-problems and questions of humanity that require broad responses and the synthesis of ideas across disciplines that are traditionally held separate from each other in schools. I asked the participants in this study the following question that was asked of me by my Advisor, Dr. Norma Hafenstein: *What will our perceptions of this time be in five years?*

> "I hope we all consider what is really important about teaching and learning."
>
> "Content can be structured and taught in ways that can better encourage students to deeper and more applicable learning."
>
> "Perceptions of how things get done will be altered and we will need to respond accordingly."
>
> "Trauma will be a certainty and we will look back and realize that we adjusted to both deal with this and to not promote practices in schools that exacerbate such trauma."
>
> "We'll have realized that this time was one of reset and introspection. We'll have questioned and responded to the question of how we interact with one another and how are individual countries responsible to each other to tend to any issues of potential global impact."

"I see this time changing our society substantially. Hopefully for the better. I do believe we are becoming more educated AND enlightened as humans on this earth. That is one reason I enjoy teaching and interacting with our youth- GT and otherwise. I believe we can look back at this time in history and see it as an opportunity to shine the spotlight on weaknesses in our local, national, and international communities and reflect on the enormous potential we have to make positive changes albeit a sad and scary time."

"Experts in various fields from education to economics and foreign policy have been calling for change in education and policy so that our students and citizens can match the current economic environment in regard to automation, globalization, and the growing gaps between the haves and have nots. Hopefully this time is seen as the beginning of the implementation of many of those changes."

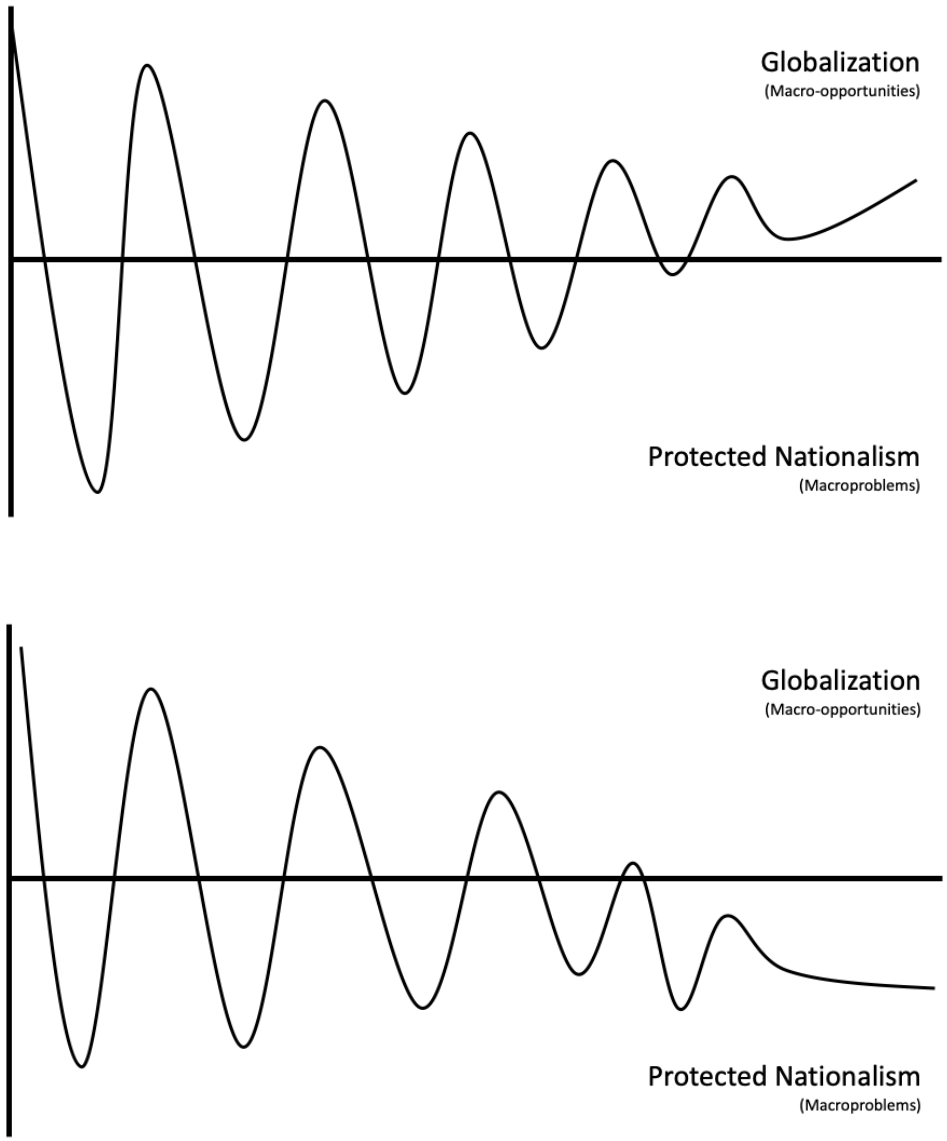
"Education is the most important building block in that foundation, so if schools can lead the way, we'll be able to look back and say this was when the flaws in the system finally started to be addressed and taken seriously by those who hid behind "philosophy" rather than facts."

"If nothing else, I feel that is one thing our program is trying to prepare our students for whether they understand it at this point. How to be leaders in a time of crisis when there is no road map."

As for me, I believe there will be an oscillating rebound from this period of virus-induced quarantine and pandemic. We will universally oscillate between trends of global cooperation and protected nationalism. How our systems of education respond may very

well dictate which of the following two patterns will stabilize from this period of oscillation.

Figure 5.9
Oscillation Between Globalization and Protected Nationalism



One pattern accelerates history into the realm of globalized and connected perspective and macro-opportunity. The other dives into a time of hyper-nationalized ideology characterized by constant and potentially devastating macro-problems. I believe

many school systems will create new structures to address the increased demands on the parts of students and families to implement engaging and malleable learning environments that are more agile and responsive to students needs and – I truly hope – interests and curiosity.

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Appendix A: Informed Consent

University of Denver
Consent Form for Participation in Research

Title of Research Study: Nurturing Excellence: A Case Study of High School Learning Environments for the Gifted

IRBNet: #1467512-1

Researcher: Ryan McClintock, MA, EdD Candidate, University of Denver
Faculty Advisor: Norma Hafenstein, PhD, Professor, University of Denver

Purpose: You are being asked to participate in a research study. The purpose of this research is to explore learning environments designed to maximize the agency, confidence, and curiosity of gifted and talented and twice-exceptional students.

Procedures: If you participate in this research study, you will be first invited to complete a brief survey/questionnaire followed by an interview that will last approximately twenty to thirty minutes. With your permission, the researcher will audio record interviews to ensure accuracy. Recordings will be destroyed after transcription. Additionally, your school/program's learning environment will be observed over the course of one-two days. Observations apply to teachers and to administrators (if administrators are present and active in the learning environment). Counselors will not be involved in the observations. The researcher will take notes during observations, which will be password-protected and stored on encrypted University of Denver servers. Finally, you will be asked to participate in a follow-up interview to take place in a second site visit. This interview, like the first interview, will also take approximately twenty-thirty minutes to complete.

Voluntary Participation: Participating in this research study is completely voluntary. Even if you decide to participate now, you may change your mind and stop at any time. You may choose not to be interviewed or have your classroom observed for any reason without penalty. There are no consequences if you choose not to participate. Participation will not impact your employment or be used as part of your job evaluation.

Risks or Discomforts: Potential risks and/or discomfort of participants may include speaking candidly about your instructional and educational beliefs, objectives, and practices in interviews. Otherwise, there are no foreseeable risks or discomforts that would normally be encountered in daily instructional practices.

Benefits: If you agree to participate in this study, there will be no direct benefit to you except contributing to a study that will inform district and high school educators and

educational leaders of programs and programming they can implement to best engage and develop their respective gifted learners.

Confidentiality: The researcher will use pseudonyms to keep participant and school information safe throughout this study. Audio recordings of interviews will be destroyed after transcription. Your and your school's identities will be kept private when information is presented or published about this study. Should you choose to allow the researcher to photo document artifacts of instruction and learning in your classroom, any personal and school identifiers will be removed. Full transcripts of your interview responses and data collected during observations will be encrypted and stored on password-protected University servers. They will not be shared with anyone. Excerpts of data may be used in presentations and published articles or essays. All data will be presented with pseudonyms.

Questions: If you have any questions about this project or your participation, please contact Ryan McClintock at ryan.mcclintock@du.edu at any time. You may also contact Dr. Norma Hafenstein at nhafenst@du.edu.

If you have any questions or concerns about your research participation or rights as a participant, you may contact the DU Human Research Protections Program by emailing IRBAdmin@du.edu or calling 303-871-2121 to speak to someone other than the researcher.

Options for Participation
Please initial your choice for the options below:

__ The researcher may audio/video record or photograph me during the study.

__ The researcher may NOT audio/video record or photograph me during this study.

Please take all the time you need to read through this document and decide whether you would like to participate in this research study.

If you agree to participate in this research study, please sign below. You will be given a copy of this form for your records.

_____ _____
Participant Signature **Date**

_____
Printed Name

Appendix B: Survey Questionnaire

Q1 How long have you been in education?
Less than one year
1-4 years
5-9 years
10–14 years
More than 15 years

Q2 How long have you been an educator at your school?
Less than one year
1-3 years
4-6 years
7-10 years
More than 10 years

Q3 What school/program did you attend for your teacher preparation program?
[short answer]

Q4 What is your highest degree earned?
Bachelor
Masters
Doctorate
Other:

Q5 Which best describes your current role at your school?
Teacher
Counselor
Administrator
Support Staff

Q6 How long have you been in the role you indicated in Q5?
1-3 years
4-6 years
7-10 years
More than 10 years

Q7 If you are an administrator, how long did you teach prior to becoming a principal?
1-3 years
4-6 years
7-10 years
More than 10 years

Q8 If you are an administrator, what school/program did you attend for your principal preparation program?
[short answer]

Q9 How many full-time certified employees are at your school who are GT Teacher, GT Coordinator, or GT Specialist?
0 (1)
1 (2)
2 (3)
3 (4)
More than 3 (5)

Q10 How many part-time certified employees are at your school who are GT Teacher, GT Coordinator, or GT Specialist?
0 (1)
1 (2)
2 (3)
3 (4)
More than 3 (5)

Q11 How many classified employees at your school work directly for the GT program?
0 (1)
1 (2)
2 (3)
3 (4)
More than 3 (5)

Q12 Rate your personal knowledge around the overall needs of GT students.
Expert level (1)
Moderate level (2)
Basic level (3)
Somewhat limited level (4)
Limited level (5)

Q13 Rank order the topics based on your level of personal knowledge, (1) being the topic you are most knowledgeable about (click and drag)
___ The GT identification process
___ The creation of plans to support GT learners
___ The gifted and talented law and policy of your state
___ The academic needs of GT learners
___ The social-emotional needs of GT learners

Q14 In what ways have you acquired knowledge about GT learners? Select all that apply.
— My teacher/administrator preparation program (1)
— Being a classroom teacher with GT students in my class (2)

— Being a GT teacher in a self-contained or pull-out class (3)
— Being the parent of a GT student (4)
— Being a GT student myself (5)
— School provided professional development (6)
— District provided professional development (7)
— Personally seeking out my own professional development (8)
— Other: (9) _____

Q15 Rank order the ways you have acquired knowledge about GT students in terms of value, (1) being the most valuable way you personally acquired knowledge about GT student. (Click and drag)
— My teacher/administrator preparation program (1)
— Being a classroom teacher with GT students in my class (2)
— Being a GT teacher in a self-contained or pull-out class (3)
— Being the parent of a GT student (4)
— Being a GT student myself (5)
— School provided professional development (6)
— District provided professional development (7)
— Personally - seeking out my own professional development (8)
— Other: (9) _____

Adapted from the Survey of Knowledge and Attitudes on Gifted Programming (Urlik, 2017).

Appendix C: First Interview Protocol with Participants

Thank you for taking the time to meet with me today. I am Ryan McClintock, a student at the University of Denver. Today is [day], [month] [date], [year] and I am interviewing [participant]. The reason why I have asked you to participate in this interview is to understand and describe your experiences working with gifted high school students at this school.

I am going to spend the next 30–60 minutes asking you questions about your views about gifted education and your learning environment. The consent form you signed means that I can record and transcribe this interview. I will also be taking notes during this interview. The information and data from this interview will be used for a doctoral research project and could be published. This interview recording or transcript will not be accessible to anyone but me and will be stored in a secure location. The information from this interview will not be shared with any other participant or employee at this school during the time of this research project or after the research is completed.

Do you have any questions before we begin?

I'm going to ask you a few questions that are meant to guide our conversation. Please feel free to expand your answers as you feel comfortable – to best describe your work on behalf of your students, their families, and your colleagues.

Question 1	Please tell me a bit about your background. How did you arrive in education? Where did you begin your career?
Question 2	How did you get involved in this program/school?
Question 3	How do you get to know your GT students?
Question 4	Please describe how this program/school nurtures and respects GT students' power, choice, and voice (especially as compared to any other programs and schools in which you've worked).
Question 5	How are GT students able to manifest their curiosity in the form of asking their questions? (How are they given opportunities to seek and share answers to their original questions? How are students afforded time to dive deeply into an idea or topic?)
Question 6	How are you able to gauge and tend to GT students' levels of confidence in themselves and in their learning?
Question 7	What are some of the challenges of working in your program/school?
Question 8	Who or what areas of the learning environment do you recommend I observe? Which areas should I observe? Why?
Question 9	Is there a question I didn't ask that you wish I had asked?

Thank you again for taking the time to meet with me. If you have any additional information you want to share, please email me at the email listed on your copy of the consent form.

I have a few more questions to close:

- *When reading your interview, is there anything you would like me to think about or pay attention to?*
- *Would you be interested in a copy of the transcript?*
- *I may be sending you a part of my data analysis to verify that I have portrayed the information you shared truthfully and accurately. Is this okay with you?*

Appendix D: Second Interview Protocol with Participants

Thank you for taking the time to meet with me today. I am Ryan McClintock, a student at the University of Denver. Today is [day], [month] [date], [year] and I am interviewing [participant]. The reason why I have asked you to participate in this interview is to understand and describe your experiences working with gifted high school students at this school.

I am going to spend the next 30–60 minutes asking you questions about your views about gifted education and your learning environment. The consent form you signed means that I can record and transcribe this interview. I will also be taking notes during this interview. The information and data from this interview will be used for a doctoral research project and could be published. This interview recording or transcript will not be accessible to anyone but me and will be stored in a secure location. The information from this interview will not be shared with any other participant or employee at this school during the time of this research project or after the research is completed.

Do you have any questions before we begin?

I'm going to ask you a few questions that are meant to guide our conversation. Please feel free to expand your answers as you feel comfortable – to best describe your work on behalf of your students, their families, and your colleagues.

Question 1	What are some of your most memorable moments from your days as a student? (At any level of education)
Question 2	What reason(s) do GT students often cite regarding why they joined your learning environment and why they stay?
Question 3	What can you point to (or describe) as some of the most promising aspect of your program/school - something in which you think students will continue to excel and contribute moving forward?
Question 4	By exercising more agency than in more traditional settings, what do you think your GT students are experiencing that will truly benefit them in the future?
Question 5	How do your students utilize technology to connect with others outside of the learning environment? How do they share their learning with their community and those in other parts of the county, state, country, and/or world?
Question 6	How does teaching (leading or counseling) in this program/school maximize your agency, curiosity, and confidence?
Question 7	Is there anything else you would like to share?

Thank you again for taking the time to meet with me. If you have any additional information you want to share, please email me at the email listed on your copy of the consent form.

I have a few more questions to close:

- *When reading your interview, is there anything you would like me to think about or pay attention to?*
- *Would you be interested in a copy of the transcript?*

I may be sending you a part of my data analysis to verify that I have portrayed the information you shared truthfully and accurately. Is this okay with you?

Appendix E: Observational Protocol

Wide-angle
Start with a particular place in the learning environment and work your way clockwise describing everything you see and hear. The goal is to absorb and record the particulars of the setting.
Multi-sensory
Describe each section of your environment using each sense. Much of this observation may need to be imagined or described metaphorically.
Lens-specific
View environment and participants with a strict theoretical lens (e.g., self-determination theory or student agency). Note all aspects of the setting that pertain to the lens for approximately 15 minutes, then take more generalized observation notes.
Episodic Vignette
This process involves selecting a starting point and describing the situation. Dialogue, facial expression, body language, activity, etc. Vignettes have clear ending points and are written in real time and present tense. Examples: describe a teacher's announcement, an unplanned disruption, or student activity.

Observational protocol adapted from Uhrmacher, McConnel Moroye, & Flinders (2017)

Appendix F: Community Partner

Description of Partnership

The GT2 Secondary Summit (GT2) is an organization of Colorado-based secondary gifted and talented facilitators, coordinators, and directors from urban, suburban, and rural school districts. The group first organized in 2017 at the Colorado Association for Gifted and Talented (CAGT) annual conference with the goal of advancing secondary GT education in Colorado along the following strands:

- Activities (e.g., CAGT Legislative Day)
- Networking (support, camaraderie, and recognition)
- Student-centeredness (ALPs, engagement, agency)
- Professional development & training
- Conference proposals and presentations
- Colorado Department of Education (policy, underrepresented GT, equity)
- Social-emotional supports & curriculum development
- Parent & parent group involvement
- Connecting with teacher preparation programs

The group meets several times a year at various hosting locations and schools. The 2018-2019 meetings were hosted in schools and offices in the following districts: Jeffco Public Schools, Cherry Creek School District, Douglas County School District, Poudre School District, and Denver Public Schools. High school GT student representatives attend each meeting with their faculty advisors and have themselves formed a GT2 student group called the Colorado Gifted and Talented Student Board

(CGTSB). The CGTSB exists to inform GT2, to design and enhance secondary GT programs and programming, and to create novel cross-district partnerships.

GT2 has generously agreed to partner with me and support my Doctoral Research Project. The following documents are individually signed by GT2 representatives agreeing to serve as my DRP Community Partner.

Partnership Contracts

GT2 Colorado Secondary Summit

To: Ryan McClintock

From: Marla Caviness-French, GT2 Colorado Secondary Summit

Date: April 12, 2019

RE: Community Partnership

The GT2 Colorado Secondary Summit is available and interested in serving as your community partner. Enhancing secondary gifted education programming opportunities and the leadership that supports such efforts are central to the mission of the GT2 Colorado Secondary Summit.

The GT2 Colorado Secondary Summit will provide constructive feedback and support as you design and implement the phases of your doctoral study.

Thank you for initiating this work.

Marla Caviness-French

GT2 Summit Representative

Marla Caviness-French
April 15, 2019

Ryan McClintock

University of Denver Researcher

Ryan McClintock
4/12/19

GT2 Colorado Secondary Summit

To: Ryan McClintock
From: Jennifer Gottschalk, GT2 Colorado Secondary Summit
Date: April 12, 2019
RE: Community Partnership

The GT2 Colorado Secondary Summit is available and interested in serving as your community partner. Enhancing secondary gifted education programming opportunities and the leadership that supports such efforts are central to the mission of the GT2 Colorado Secondary Summit.

The GT2 Colorado Secondary Summit will provide constructive feedback and support as you design and implement the phases of your doctoral study.

Thank you for initiating this work.

GT2 Summit Representative

University of Denver Researcher