EXAMINING MOTIVATION, CHOICE, AND COMPETENCY IN 21ST-CENTURY MICRO-SCHOOLS: A COMPARATIVE MIXED-METHODS STUDY OF MIDDLE GRADE STUDENTS' PERCEPTION OF STUDENT AGENCY

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AUTHORIZATION TO SUBMIT

DISSERTATION

This dissertation of Angela Bruggeman, submitted for the degree of Doctor of Philosophy with a major in Educational Leadership and titled "Examining Motivation, Choice, and Competency in 21st-Century Micro-Schools: A Comparative Mixed-Methods Study of Middle Grade Students' Perception of Student Agency," has been reviewed in final form. Permission, as indicated by the signatures and dates given below, is now granted to submit final copies.

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Admittedly, I entered this pursuit with some insecurities. The journey to a doctoral degree seemed an untouchable dream. The added challenge of completing a doctoral research project during the global COVID-19 pandemic multiplied the pressure. Without the incredible support of my husband, my kids, parents, and colleagues I could not have finished. Compelled by a passion to learn how to think more deeply and to make a difference in the field of education, I stepped forward, chin up, a little wobbly in the knees, and set for a challenge.

NNU's online doctoral program for working professionals has worked well for me. First, completing the Ed.S. online convinced me pursuing the Ph.D. was not a lofty, unattainable goal. Then, with the onset of the pandemic, the online learning platform became a normal activity amidst chaotic work demands. With the faithful push of my professors, my chair, and Cohort 9, or the "COVID Cohort," we have arrived at the finish line. While the dissertation research has been a monumental effort, it is not so much a finish as it is a beginning. Now we step out, don a floppy velvet cap, and learn more, write more, propose more, to make the world of education better.

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DEDICATION

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ABSTRACT

Facing a future of rapidly changing technology, collaborative workflow, and expectations for autonomy and agility in the workplace, schools must develop non-cognitive skills for 21st-century learners. Micro-schools, an understudied innovative environment, embed strategies for developing student agency, a non-cognitive trait necessary for Generation Alpha and Generation Z cohorts. This comparative mixed-methods study examines 119 middle grades students' perception of student agency regarding motivation, choice, and competency in MS or CPS environments. Bronfenbrenner's Bio-ecological Model, placing school at the microsystem level of influence, provides a theoretical framework. Explanatory sequential design utilizes a Likert-scaled Combined SIMS/PLS survey followed by semi-structured focus groups. Frequency reporting and calculated Mann Whitney U Mean Ranks examine survey data. Results reveal the impact of the MS environment on learners' sense of agency. Topical coding methods of focus group transcripts resulted in six themes across school settings including Impact of Environment, Program Elements, Relationships, Motivation, Choice, and Personal Competency. Combined findings indicate school environments may generate normalization of learning, inquiry, and engaging creative processes. Outcomes suggest educators enhance intrinsic motivation and autonomy by creating environments rich with access to effective personalized technology, power to choose and act in alignment with personal interests, and collegial educator-student relationships.

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Chapter I

Introduction

The complex interplay of all aspects of a child's life, including home, community, and school environments, directly affect maturing processes (Bronfenbrenner, 1977; Daily et al., 2019; Kiefer et al., 2015; Latsch, 2018; Peterson, 2011; Wertsch, 2005). For 21st-century students, the school environment includes peers, teachers, and use of technological devices with access to the internet ranging from phones, tablets, to desktop computers (Buzzetto-Hollywood & Alade, 2018; Kiefer et al., 2015; Meyer, 2018; Selwyn et al., 2017; Zhou et al., 2017). Yet, learners in a tech-saturated age are growing human beings: intellectual, emotional, relational, and spiritual (Cho & Littenberg-Tobias, 2016; Oriol et al., 2017; Rheingold & Seaman, 2017). In particular, today's middle grade students, ages nine to thirteen, are in a transitional learning environment, with a thrust toward digitizing classrooms by some educators and a hesitancy to leap too quickly by others (Batsila & Tsihouridis, 2016; Bennett et al., 2008; Eisenbach et al., 2020; Kormos, 2018; Starks et al., 2018; Storz & Hoffman, 2013; Wolff et al., 2020). Middle grade students are already operating in an uneasy mental, physical, and social state; the disequilibrium of classroom changes may exacerbate any sense of awkwardness (Akos, 2004; Bishop & Harrison, 2021; Harter, 1982; Kiefer et al., 2015; Kim et al., 2014; Sørlie et al., 2020; Starks et al., 2018). In the midst of rapid technological advancement, high stakes testing accountability, and workforce shifts, educators must remain committed to the need to educate the whole child (Cho & Littenberg-Tobias, 2016; Donsky & Witherow, 2015; Egalite et al., 2016; Meyer, 2018; Michelman, 2018; Patrikakou, 2016; Peterson, 2011; Rheingold & Seaman, 2017; Whitehead, 2017).

The micro-school (MS), a relatively new small-school environment, incorporates modern qualities of both personalized digital learning constructs and a student-centric approach (Cohen, 2017; Horn, 2016; Kapoor, 2015; Katzman & Horn, 2016; Linaberger, 2018). MSs take advantage of digitally based personalized learning platforms as an accessible venue for mastery of core subjects at individualized targeted levels, while student learning occurs within a small, open, student-directed, educational community (Crischelle, 2020; Horn, 2016; Koteskey, 2018; Linaberger, 2018; Prothero, 2016; Sandefer, 2018). MSs serve students from early elementary to high school, yet middle grade students, already in a developmentally fragile state, are of particular interest (Eisenbach et al., 2020; Kim et al., 2014; Starks et al., 2018). The environment of learners in the middle grades deserves focus at a crucial developmental stage (Daily et al., 2019; Eisenbach et al., 2020; Harrison et al., 2021). Teacher-facilitators in the smaller environment of a MS are able to engage students in the learning at a socio-emotional level through conversation, student input, and project-based learning (Crischelle, 2020; Kapoor, 2014; Linaberger, 2018). Framed by Bronfenbrenner's Bio-ecological theory of human development, the researcher aims to provide insight into the impacts of the contemporary MS environment on the development of the whole middle school aged child (Ashiabi & O'Neal, 2015; Bronfenbrenner & Evans, 2000). In order to make observations about a setting's impact on development, students should be studied within a familiar environment, rather than a laboratory setting (Bronfenbrenner, 1977; Penn, 2005; Wertsch, 2005). In particular, this study focuses on three aspects of the non-cognitive trait of student agency, including motivation, choice, and competency in the context of the Bio-ecological Model's proximal processes (Bronfenbrenner & Evans, 2000; Gehlbach et al., 2016; Hitlin & Elder, 2007; Vaughn, 2018).

During the COVID-19 pandemic in 2020, the term “micro-school” was used to describe pop-up homeschool situations, named “micro” due to the minimal number of learners involved (Capoot, 2020; Sass, 2021; Zimmerman, 2020). Parents, uncertain of potential health risks and the effectiveness of fully remote learning due to school building closures, set up temporary home pods including small groups of children from the same neighborhood or friend groups led by a tutor (Capoot, 2020; Zimmerman, 2020). Some non-profit organizations offered parents an online option to provide educational resources for children in small neighborhood pods advertised as “micro-school” supports (Zimmerman, 2020). The pandemic-created micro-schools cannot be compared to the educational construct of the innovative MS addressed in this study (Capoot, 2020; Zimmerman, 2020). Additionally, the pandemic requirement to school-from-home illuminated educators’ awareness of students’ need for engagement, relationships, and owning one’s learning (Avery et al., 2021).

MS, a word coined in the mid-2000s by British educators, is a term used to describe a privately funded, innovative small school; small in both relative building size and in student population (Crischelle, 2020; Horn, 2016; Koteskey, 2018). Relatively little is known about what makes innovative MS successful or if the 21st-century model will endure (Cohen, 2017; Katzman & Horn, 2016; Koteskey, 2018; Miller et al., 2014; Russo, 2017). While progressive educational periodicals, edu-treprenuers, and forward-thinking associations provide expert reviews on describing the MS model, empirical research is quiet on the topic of the school model’s effectiveness (Crischelle, 2020; Horn, 2016; Kramer, 2018; Linaberger, 2018; Prothero, 2016; Rivera, 2016; Sandefer, 2018).

MSs are compared to the one-room schoolhouses of rural America or the open classrooms popular in Europe during the 1920s and ‘30s and in the United States (U.S.) in the

‘60s and ‘70s (Deed et al., 2014; Kelchtermans, 2017; Kramer, 2018; Linaberger, 2018). The model has an open, more student-directed flow and is not framed on a factory model with bells and segmented subject times (Horn, 2016; Kapoor, 2015; Kramer, 2018; Prothero, 2016;). MS such as Kahn Lab School, Prenda, and Acton Academy reimagine a learning structure including peer-to-peer tutoring and creative projects, and a heavy reliance on personalized digital learning tools for core instruction (Cohen, 2017; Crischelle, 2020; Cuban, 2017; Horn, 2016; Kapoor, 2015; Katzman & Horn, 2016; Rivera, 2016). Other examples include Mysa School in Washington, AltSchools in Silicon Valley and New York, NuVu in Cambridge, Massachusetts, and Portfolio School in New York (Artz, 2018; Cohen, 2017; Cuban, 2017; Horn, 2016; Kramer, 2018; Katzman & Horn, 2016; Koteskey, 2018). Innovative startup schools are frequently backed by prominent people in the technology industry and highlighted at the forefront of the educational sector (Cohen, 2017; Koteskey, 2018; Russo, 2017). While educational writers extol the vision of MS founders and leaders, current literature does not provide studies to indicate the degree to which the model is effective in meeting the developmental needs of the students (Crischelle, 2020; Horn, 2016; Prothero, 2016). Independent schools do not have the same accountability structures as public schools (Cohen, 2017). The quantity of MS operating in the U.S. is not tracked (Prothero, 2016). Horn (2016) predicts the MS student population will increase to overtake five to ten percent of the private school sector. The MS movement has been identified as one of the most important macro trends in education over the past century (Prothero, 2016; Templeton Academy, 2018).

Sociologists and entrepreneurial educators believe schools must understand and respond to the need for resilience, adaptability, technological know-how, independent learning skills, collaborative ability, and social validation for the next generation of learners (Bellur et

al., 2015; Bennett et al., 2008; Lemley et al., 2014; McCrindle, 2020; Ozgenel et al., 2018). Edu-treprenuers, edtech companies, and policy-makers point to big data, software analytics, and smart software as keys to reinvent modern education for the 21st-century classroom (Lee et al., 2018). Targeted, digital differentiated-learning interfaces will prepare students for the adaptability needed to enter the workforce (Batsila & Tsihouridis, 2016; Project Tomorrow, 2015). MS use a variety of technology-based instructional applications such as Khan Academy, Dreambox, Moodle, Blackboard, and Lexia on personal learning devices blended with a community approach to learning (Bi & Shi, 2019; Horn, 2016; Hui, 2016; Koteskey, 2018). The model relies on relationships for collaboration and a sense of student agency in pursuing a personalized education in an open space (Cohen, 2017; Crischelle, 2020; Horn, 2016; Koteskey, 2018; Linaberger, 2018; Vaughn, 2018). Bronfenbrenner's concern for a continued focus on the good of the child by recognizing the need for a holistic view of development motivates this study (Brendtro, 2006; Bronfenbrenner, 1977; Cho & Littenberg-Tobias, 2016; Penn, 2005). As innovative models are studied, educators make strides to connect the vision of the new way of modern innovators to practical implementation in other school structures (Bingham, 2017; Stuart et al., 2017).

Personalizing education is not a new idea (Deed et al., 2014; Lee et al., 2018; Miller et al., 2014; Roberts-Mahoney et al., 2016). The individualization of lessons has roots in both Bloom's and Keller's educational philosophies of the 1960s, however, personalizing with one-on-one digital devices is a new capability (Lee et al., 2018; Roberts-Mahoney et al., 2016; Robinson & Aronica, 2015). The allowance of online access to young learners and personal media devices makes individualized and customized learning possible (Kapoor, 2015; Koteskey, 2018; Miller et al., 2014). Edtech provides teaching tools and software to capture data, analyze

results, and target personalized learning in online and offline platforms, including the impact of tutors and peer-to-peer coaching (Bingham, 2017; Cuban, 2017; Horn, 2016; Peterson, 2011). The effective use of technology is integral for the personalized aspect of the modern MS model (Koteskey, 2018). Some researchers propose educators may be equipped to reshape schools by understanding the effectual elements of innovative MS models (Cohen, 2017; DeArmond & Maas, 2018; Stuart et al., 2017).

Learners of the 21st-century are different than prior generations (Crischelle, 2020; Lemley et al., 2014; McCrindle, 2020). Therefore, educational structures may also need to change to meet the learning needs of the current student population (Lemley et al., 2014; Rue, 2018; Selwyn et al., 2017; Tarbutton, 2018). Indeed, reformers believe educators must constantly be flexing with the needs of the current generation in preparation for a new future (Bellur et al., 2015; Evans, 2018; Robinson & Aronica, 2015; Tarbutton, 2018). Generation Z and Generation Alpha students have a different mindset about school than prior generations (Apaydin & Kaya, 2020; Cavanagh, 2015; McCrindle, 2020; Rue, 2018; Selwyn, et al., 2017; Washington, 2021). Innovative reformers claim the small school model is the next phase in educational structures and well-suited to today's students to better meet the need for learning in a relational context (Darling et al., 2020; Koteskey, 2018; Rivera, 2016). The relatively new MS model deserves empirical focus and formal studies to determine the overall effectiveness (Bennett et al., 2008).

The success of school systems is generally defined by academic achievement (Hanushek et al., 2017; Kessinger, 2011; O'Neill, 2015). Standardized tests are required by districts and education systems to identify mastery of core academic skills (Cohen, 2017; Russo, 2017; Stuart et al., 2017). Educators acknowledge learning goes beyond academic acquisition (Hefty, 2014; Uhls et al., 2014). Non-cognitive skills must be considered as integral to a person's growth

(Bjorklund-Young, 2016: Brady et al., 2016; Darling et al., 2020; Egalite et al., 2016; Hoeschler, et al., 2018; Oriol et al., 2017; Tarbutton, 2018). While labeled as non-cognitive skills, researchers recognize elements such as personal qualities or soft skills require the use of cognition (Duckworth & Yeager, 2015). Educational systems today must address the necessary academic cognitive growth as well as non-cognitive aspects of learning (Bjorklund-Young, 2016; Hoeschler et al., 2018; Tarbutton, 2018). The United States government's passing of the Every Student Succeed Act (ESSA) in 2015 requires states to report on at least one non-cognitive area of learning (Bjorklund-Young, 2016; Every Student Succeeds Act [ESSA], 2015; Michelman, 2018; Tarbutton, 2018).

Bronfenbrenner's Bio-ecological Model has a sociological component encompassing the importance of the totality of a child's environment and relationships on individual development (Bronfenbrenner, 1977). According to the model, physical and chronological age does not necessarily equate to the psychological development of a given child (Bronfenbrenner, 1977; DiBenedetto & Myers, 2016; Penn, 2005). The school has an enormous influence on the child, almost to the level of impact as the individual's immediate family (Ben-Eliyaho & Bernacki, 2015; Bronfenbrenner & Evans, 2000). Therefore, understanding the influence of modernized models on a new generation of learners benefits the educational system as a whole (Bennett et al., 2008; Byers et al., 2018; Christakis et al., 2018).

The Bio-ecological Model originating from the 1970s identifies the importance of environment on the development of the child and remains a firmly held and empirically backed model well into the 21st-century (Bronfenbrenner, 1977; Bronfenbrenner & Evans, 2000; O'Neill, 2015; Penn, 2005). Educators must value the non-cognitive elements of learning in every school model (Brady et al., 2016; Hoeschler et al., 2018; Lemley et al., 2014; Roberts-

Mahoney et al., 2016). As business and industry rapidly evolve, candidates entering the workforce will need to be adept in non-cognitive skills such as being adaptable, flexible, collaborative, communicative, and creative, as well as tech-savvy (Batsila & Tsihouridis, 2016; Darling et al., 2020; Hefty, 2014; Whitehead, 2017). The MS incorporates a collaborative, interdependent approach to learning (Koteskey, 2018). The potential presented by personalized learning in a small community makes studying the impacts of the strategy worth the time and effort (Christakis et al., 2018; Cuban, 2017; Miller et al., 2014; Peterson, 2011).

Educational reforms, including innovative startup models, do not only affect the individual schools directly, but have a much larger influence on the current educational landscape (Hanushek et al., 2017; Williamson, 2018). While the MS movement is small, notoriety in the greater educational field is provided by the backing of prominent, powerful figures (Hanushek et al., 2017; Williamson, 2018).

One result of personalized learning is the development of student agency (Deed et al., 2014). Student agency has arisen as a critical, multi-faceted area of student learning (Deed et al., 2014; Poon, 2018; Vaughn, 2018). Student agency describes the ability of the learner to use internal skills for decision-making to determine an academic path, set goals, create plans, self-assess, select appropriate materials, and manage time effectively (Luo et al., 2019). Agency involves student participation and open dialogue with teachers in activities such as asking questions, sharing like or dislike of learning activities, commenting positively about interests, expressing opinions during lessons, and making suggestions for improvements of class (Poon, 2018; Vaughn, 2018; Veiga, 2016). A learner's success is linked to agency and is empowered by a positive teacher-created environment and teacher-student relationships (Currie, 2018; Darling et al., 2020; Fernandes, 2019; Lin-Siegler, Dweck, & Cohen, 2016; Luo et al., 2019; Russell,

2018; Sørlie et al., 2020; Vaughn, 2018). A learner-centered school's classroom considers the individual's unique qualities in instructional content and design (Lee et al., 2018). Current research calls for a deeper study of non-cognitive learning elements to better understand human development within influential school environments (Bjorklund-Young, 2016; Brady et al., 2016; Brooks & Young, 2011; Christakis et al., 2018; Currie, 2018; Hoeschler et al., 2018; Latsch, 2018; Meyer, 2018; O'Neill, 2015).

Statement of the Problem

The impact of the MS environment on learners is an understudied phenomenon (Crischelle, 2020). The unique educational environment is a combination of a student-centered mixed-age learning community, open spaces, and digital interfaces with the targeted integration of non-cognitive elements of learning (Artz, 2018; Cho & Littenberg-Tobias, 2016; Koteskey, 2018; McCrindle, 2020; Roberts-Mahoney et al., 2016; Williamson, 2018). Research confirms the learning environment is a key factor in learner achievement (Bronfenbrenner, 1977; Kim & Capella, 2016; Lemley et al., 2014). Many are eager to respond to the rapidly emerging and unique challenges of the 21st-century learner, the digital native, with innovative learning strategies and structures, while others question the wisdom of abandoning conventional methods (Byers et al., 2018; Hui, 2016; Lemley et al., 2014; O'Neill, 2015; Prensky, 2001; Rivera, 2016; Roberts-Mahoney et al., 2016; Williamson, 2018). One approach to meeting the needs of 21st-century learners is personalized learning (Bingham, 2017; Cuban, 2017; DeArmond & Maas, 2018). Personalized learning implies a goal of elevating all students' academic potential through customized lessons (Cuban, 2017; Darling et al., 2020; Lee et al., 2018; Peterson, 2011). The customization is in content, methodology, personal interest, and pacing (Lee et al., 2018). The academic benefits of digital personalized learning platforms open prospects for diverse schooling

settings, still children remain in the impressionable maturing years and strong consideration must be taken in shaping influences in the learning environment (Christakis et al., 2018; Cohen, 2017; Cuban, 2017; Lemley et al., 2014; Peterson, 2011; Williamson, 2018).

The landscape of the 21st-century classroom includes a blend of traditional 1990s school items, whiteboards, overhead projectors, books, worksheets, desks, live students, and live teachers with elements of an emerging era (Peck et al., 2015). Now tables once laden with textbooks, notebooks, paper and pencil, are strewn with tablets, laptops, phones, and chargers (Peck et al., 2015; Selwyn et al., 2017). Technology in today's schools is both an intentional school reform and for some an unexpected, uninvited, catalyst for change (DeArmond & Maas, 2018; Kormos, 2018; Peck et al., 2015). Many of today's learners have continuous innovative agility and interact with Information and Communications Technologies (ICT) in school (Hui, 2016). The norm is shifting to include personal digital devices for an age of tech-savvy, multi-tasking learners (Peck et al., 2015; Schwieger & Ladwig, 2018; Selwyn et al., 2017; Uhls et al., 2014). The practice is becoming commonplace for schools to implement hybrid and blended learning models (Bi & Shi, 2019; Bingham, 2017; Hui, 2016; Katzman & Horn, 2016; Ravenscroft & Luhanga, 2018; Roberts-Mahoney et al., 2016; Zainuddin, 2018). Requiring one-to-one devices as an expected school tool has changed the landscape of learning centers in multiple ways including student behavior, classroom disruptions, and parent-student communication (Apaydin & Kaya, 2020; Cho & Littenberg-Tobias, 2016; Selwyn et al., 2017). Teachers and systems are adjusting to the invasion of the digital world within the classroom (DeArmond & Maas, 2018; Donsky & Witherow, 2015; Kelchtermans, 2017). Reformers are eager to identify and implement models which improve student learning, including the use of digital personalized learning platforms in innovative school models (Cho & Littenberg-Tobias,

2016; Cuban, 2017; DeArmond & Maas, 2018; Donsky & Witherow, 2015; Eisenbach et al., 2020; Horn, 2016; Peterson, 2011; Rivera, 2016; Selwyn et al., 2017).

Personalized learning is typical in newer inventive school models, yet educators do not have a firm grasp on the effects of digitized personalized learning in innovative schools regarding relationships (Cho & Littenberg-Tobias, 2016; Crischelle, 2020; Cuban, 2017; Williamson, 2018). Studies continue to explore blended learning, student-centered frameworks, and personalized learning (Bi & Shi, 2019; Cuban, 2017; Kapoor, 2015; Kassem, 2019; Luo et al., 2019; Oluwatayo et al., 2016; Quinn, 2015; Ravenscroft & Luhanga, 2018; Sigurðardóttir & Hjartarson, 2016; Zainuddin, 2018). There exists an opportunity to study the appropriate application or structure of innovative technological strategies in the modern classroom for middle grade students (Eisenbach et al., 2020; Evans, 2018; Peck et al., 2015). There is a need to expand educational research into school models engaging multiple modern strategies, specifically, MSs (Horn, 2016; Koteskey, 2018; Rivera, 2016).

Technology's disruption in today's classroom is inevitable and irreversible (Eisenbach et al., 2020; Peck et al., 2015; Quinn, 2015). The required shift to remote learning platforms, instigated by the COVID-19 pandemic restrictions, served as an added catalyst for digital learning methods (Avery et al., 2021). Software platforms offer customized leveled lessons, targeted specifically to an individual's zone of learning (Horn, 2016; Kapoor, 2015; Rivera, 2016). Workplaces of the 21st-century expect agile employees, flexible enough to master new software and hardware with ease (Batsila & Tsihouridis, 2016; DiBenetto & Myers, 2016; Evans, 2018; Hamad, 2017; Katzman & Horn, 2016; Meyer, 2018; Whitehead, 2017). Proponents of educational technology are providing schools with models of personalized learning, blended learning, and one-to-one devices at an unprecedented rate (Cuban, 2017; Patrikakou, 2016; Peck

et al., 2015). Educators leading in the MS and innovative schools movement see the benefits of creating a collaborative, personalized, relational, and creative learning environment (Cohen, 2017; Lemley et al., 2014; Linaberger, 2018; Quinn, 2015; Stuart et al., 2017; Templeton Academy, 2018).

Educational reformers are watching the MS movement with curiosity to determine the scalability of the MS model (Cohen, 2017; Russo, 2017). MSs are marked by

- a small student body
- an open shared space
- a less structured learning environment
- a student-centered philosophy
- student autonomy
- mixed-age learning groups
- digital personalized learning platforms for core subjects
- hands-on projects
- non-traditional schedules and calendars
- and teachers as facilitators, guides, coaches, or mentors

(Crischelle, 2020; Templeton Academy, 2018; Horn, 2016; Katzman & Horn, 2016; Rivera, 2016).

Students in the MS setting are part of shaping educational decisions (Kapoor, 2015; Linaberger, 2018; Sigurðardóttir & Hjartarson, 2016). In a MS, content delivery is accomplished through videos, readings, podcasts, and other individualized tasks (Horn, 2016; Kapoor, 2015; Rivera, 2016). Learners engage in the world outside of school through meaningful projects and accomplish core instruction through personalized learning software (Cuban, 2017; Horn, 2016;

Kapoor, 2015; Peterson, 2011; Rivera, 2016). Students work on projects together and use portfolio platforms to demonstrate learning (Horn, 2016; Kapoor, 2015). A sense of choice, student voice, individualized platforms, and autonomy are expected to increase student agency (Poon, 2018; Richardson, 2019; Vaughn, 2018).

The MS movement is not without challenges (Crischelle, 2020; Cohen, 2017; Katzman & Horn, 2016). Innovative schools continue to face funding challenges, as educators desire the freedom to explore opportunities to help at-risk students (Cohen, 2017; Katzman & Horn, 2016). Finding enough properly trained entrepreneurial educators willing and equipped to lead and remain committed to such a school is a challenge (Cohen, 2017; Curry & Mania, n.d.; Ronskley-Pavia et al., 2019). MS teachers must have expertise combined with passion and strong stamina (Crischelle, 2020). Finally, uncertainty remains in deciding on methods for demonstrating student outcomes in a standardized way (Crischelle, 2020; Cohen, 2017; Prothero, 2016).

Positive adoption of educational technology is not ubiquitous in all classrooms, yet recent research encourages site-based investigations to be conducted with a focus on advancements in technology integration (Byers et al., 2018; Evans et al., 2018; Peck et al., 2015; Williamson, 2018). Conservative educators warn of the temptation to over-innovate and disregard a sense of stability in the learning structure (O'Neill, 2015; Stuart et al., 2017). There may exist negative social impacts of reliance on technology-based personalized learning for core subjects (Alrashidi, Phan, & Ngu, 2016; Fernandes, 2019; Gehlbach et al., 2016; Kiefer et al., 2015; Kim & Capella, 2016). Some educators and parents remain deeply concerned technology innovations are moving too rapidly, with little consideration for overall impact (Bellur et al., 2015; Evans, 2018; Livingstone et al., 2012; Meyer, 2018; Meyers, 2009; O'Neill, 2015; Roberts-Mahoney et al., 2016; Rodriguez-Gomez et al., 2018). Digitally based personalized learning has potential

ramifications for social-emotional maturation which educators must keep in mind (Christakis et al., 2018; Williamson, 2018). Students in MSs may spend two-and-a-half to four hours a day on digital platforms (Horn, 2015; Kapoor, 2015). There is a lack of clarity as to the impacts of the digital mode of instructional integration on the non-cognitive domains of learning, such as student agency (Kassem, 2019; Patrikakou, 2016; Richardson, 2019). Understanding the relational impact of personalized learning will aid teachers with curriculum design and implementation while keeping the essential human connection as part of the learning atmosphere (Darling et al., 2020; Kim & Capella, 2016; Patrikakou, 2016; Zainuddin, 2018).

While there are years of study ahead in the educational technology arena, understanding the effective use of technology in schools and MSs may be a reasonable place to begin to fill the knowledge gap (Evans, 2018; Tarbutton, 2018). The purpose of this study is to examine the impact of the unique MS environment on the development of student agency in regard to motivation, choice, and competency for middle grade students (Mameli et al., 2019; O'Neill, 2015; Oluwatayo et al., 2016; Wolff et al., 2020; Wall et al., 2018). Student learning-outcomes from MSs, both cognitive and non-cognitive, will become available as time passes (Hoeschler et al., 2018; Prothero, 2016). Current research and educational pundits call for studies to empirically determine a need to change systems to meet the needs of the 21st-century learners (Apaydin & Kaya, 2020; Bennett et al., 2008; Evans, 2018; Goral, 2018).

Background

There is a call for educational researchers to imagine a future catalyzed by an edtech revolution and determine social impacts of models outside of conventional methods (Evans, 2018; Rodriguez-Gomez et al., 2018; Williamson, 2018). Schools of all shapes and sizes have responded to district and political directives for inserting technology in the classroom (Koteskey,

2018; Lemley et al., 2014; Tarbutton, 2018). Institutions try innovations such as one-to-one devices, personalized learning software, blended learning, the flipped classroom, smart boards, social media, and online discussion boards (Bi & Shi, 2019; Cuban, 2017; Hamad, 2017; Ingalls, 2017; Quinn, 2015; Storz & Hoffman, 2013; Stuart et al., 2017; Zainuddin, 2018). Some are concerned too much screen time or constant access to the distractions of informational technologies may be detrimental to normal human development (Bellur et al., 2015; Christakis et al., 2018; Livingstone et al., 2012; Meyer, 2018; Meyers, 2009; O'Neill, 2015; Patrikakou, 2016; Storz & Hoffman, 2013; Uhls et al., 2014; Zhou et al., 2017). However, complete alienation from digital platforms may cripple a 21st-century teen from necessary online social skills (Przybylski &Weinstein, 2017).

Leading the charge in reforming education are venture philanthropists such as Bill and Melinda Gates, Sal Kahn, and Mark Zuckerberg (Cohen, 2017; DeArmond & Maas, 2018; Williamson, 2018). The entrepreneurial culture of Silicon Valley is eager to present technical solutions as a panacea to all educational woes (Cohen, 2017; Williamson, 2018). Beginning early in the 2000s a few innovative schools, currently known as MSs, have appeared across America (Horn, 2016; Prothero, 2016). MSs are a subset of current innovative school models (Cohen, 2017; Koteskey, 2018). Backed by high profile entrepreneurial or tech-driven business philanthropists, MSs are part of the trend to innovate education through private corporatization (DeArmond & Maas, 2018; Roberts-Mahoney et al., 2016; Russo, 2017; Williamson, 2018). MSs are relatively small, student-centered, innovative classrooms commonly marked by a combination of hands-on activities, collaboration, original thinking, and digital interfaces (Artz, 2018; Crischelle, 2020; Hefty, 2014; Hui, 2016; Stuart et al., 2017). Many educators seek effective ways to utilize personalized learning and work to study new, more student-centered,

learning models (Artz, 2018; Cuban, 2017; Hui, 2016; Kassem, 2019; Lee et al., 2018; Luo et al., 2019; Peterson, 2011; Stuart et al., 2017). If elements of MS learning models can scale to larger institutions, more students may benefit from the findings (Katzman & Horn, 2016; Stuart et al., 2017).

Bronfenbrenner's (1977) Bio-ecological Model provides a framework for understanding the development of the full person and serves as a theoretical framework for the current study. The embedded concentric model recognizes influencers from the micro or central setting of home, moving into the school realm, then to the community, and finally into the macro levels of the larger world (Bronfenbrenner, 1977; O'Neill, 2015). The framework introduced in the '70s provides a scaffold for grasping the interplay of nature vs. nurture as an individual matures (Wertsch, 2005). The school environment falls within the circle of the innermost level of the framework, as an element only slightly less influential than the home on the social development of the child (Bronfenbrenner, 1977; Bronfenbrenner & Evans, 2000). The purpose of this study is to examine the impact of the unique MS environment on the development of student agency in regard to motivation, choice, and competency for middle grade students (Mameli et al., 2019; O'Neill, 2015; Oluwatayo et al., 2016; Wolff et al., 2020; Wall et al., 2018).

Research Questions

MSs warrant a close look by educational researchers to inform parents and interested stakeholders to understand the impacts on student development and achievement (Bennett et al., 2008; Horn, 2016). Research questions serve as a focal point in designing a study (Ravitch & Riggan, 2017). This study is guided be three research questions addressing the impact of the MS learning environment on student agency.

1. How does the micro-school learning environment impact a middle grade student's perception of student agency in regard to a sense of motivation?
2. How does the micro-school learning environment impact a middle grade student's perception of student agency in regard to a sense of choice?
3. In what ways does the micro-school learning environment's use of a personalized learning platform impact student agency in regard to a middle grade student's sense of competency?

Description of Terms

An explanation of terms provided within the context of a given study provides clarity and allows readers to contextualize concepts within the research study (Creswell & Guetterman, 2019). The unique topic and discussion of MSs in this study are supported in the explanation of the following terms.

Bronfenbrenner's Bio-ecological model. Bronfenbrenner's Bio-ecological Model is a framework providing specific terms to describe the impact of the interplay of multiple layers of an individual's environment on one's personal development. Bronfenbrenner is a renowned researcher in the field of educational sociology. The Bio-ecological Model is also known as the Ecological Systems Theory, Socio-ecological Theory, and the Ecological Model of Human Development in existing literature (Ashiabi & O'Neal, 2015; Bronfenbrenner, 1977; Latsch, 2018; Onwuegbuzie et al., 2013).

Choice. Choice refers to student autonomy demonstrated by personal decision-making in the individual's learning environment (Deed et al., 2014).

Combined SIMS/PLS. Elements from two survey instruments, the Situation Motivation Scale (SIMS) and the Personalized Learning Scale (PLS) were combined in this

study to address three targeted elements of student agency: motivation, choice and competency. Neither original survey instrument was used in entirety. The constructed survey was validated in context of presented study (Guay et al., 2000; Pane et al., 2015).

Competency. Competency in the context of the classroom is a personal sense of level of ability to act effectively in one's environment based on the acquisition of a variety of intellectual, artistic, physical, motivational, or social behaviors or traits (Bronfenbrenner & Evans, 2000; Lemley et al., 2014).

Conventional private schools (CPS). Commonly referred to as traditional private schools, a type of non-public educational institution populated by children of parents engaging in school choice, marked by a typical course of study, teacher-centered philosophy, lecture-based delivery of instruction, and teachers as experts (Horn, 2015; Williamson, 2018)

Edtech. Edtech is a modern term referring to the longer phrase, educational technology, in an abbreviated manner (Williamson, 2018).

Edu-treprenuers. Blending the words education and entrepreneur, edu-treprenuer is a term used to describe business developers, partners, and investors in educational innovations (Williamson, 2018).

Generation alpha. The cohort of children born in 2010 and later. Currently this age-group is in elementary and early middle school (Jha, 2020; Apaydin & Kaya, 2020; Washington, 2021).

Generation z. Generation Z, also referred to as Gen Z, represents the group of Children born after 1996 and into the early 2000s. The Gen Z generation follows the millennials (Buzzetto-Hollywood & Alade, 2018; Kane, 2017).

Information and communication technologies (ICT). Information and Communication Technology, referred to widely as ICT, describes a diverse set of electronic devices along with the application software allowing for electronic communication across the internet and networks (Peck et al., 2015; Rodriguez-Gomez et al., 2018).

Micro-schools (MS). Micro-schools are a new type of school. The term describes an innovative brick-and-mortar setting, in a small business space, utilizing digital platforms for personalized learning, attended by students of parents selecting a non-public school, and a relatively small population of students (Koteskey, 2018; Potterton, 2020).

Middle grades. Middle grades describe the school levels in which students are placed as preteens and young teens, approximately ages 9 – 14. Human development in the middle grades is a unique season of complex maturation for the individual (Bishop & Harrison, 2021; Kim et al., 2014; Starks et al., 2018)

Motivation. The term motivation describes the non-cognitive quality of one's self-generated desire to accomplish a task. Motivation, while an internal quality, may be measured by external behaviors demonstrating engagement such as raising hands, asking questions, vocalizing solutions, and giving considerable effort on assignments. A lack of motivation is demonstrated through disengaged and apathetic behaviors (Currie, 2018).

Non-cognitive domain. The non-cognitive domain includes elements of learning outside of school academics include personal qualities such as grit, growth mindset, self-control, honesty, relational competency, delayed gratification, values, motivation, and beliefs (Duckworth & Yeager, 2015).

Open classroom. The term open classroom describes a pedagogical and structural learning environment space, open both philosophically and physically, allowing students freedom of choice and fewer directive actions by the teacher (Deed et al., 2014).

Personalized learning. Personalized Learning (PL) describes individualized educational software designed to target a student's learning needs directly as well as the practice of using devices in one's learning activities (Cuban, 2017; Horn, 2016).

Reformers. Educators, political leaders, entrepreneurs, and other stakeholders who address educational concerns and advance academic achievement through the development and implementation of strategic new methods for schools, teaching, and learning (Pedersen, 2012).

Student agency. For the purposes of this study, student agency refers to the capacity of a learner to adjust and control individual actions in response to given structures, to set personal goals, be self-determined, motivated, and to effectively communicate needs and opinions (Deed et al., 2014; Mameli et al., 2019).

Student-centered. Learner-centered, as opposed to teacher-centered, is used as a descriptive term to categorize the classroom, or learner environment, where individuals' unique qualities are factored-in for instructional content and design (Artz, 2018; Lee et al., 2018).

Significance of the Study

A study of the modern MS, a 21st-century construct two decades old, helps educators understand the impact of innovative strategies such as small mixed-aged groups in open spaces, fluid schedules, project-based curriculum with integrated subjects, reliance on personalized learning applications for core subjects, and a student-centered philosophy (Artz, 2018; Cohen,

2017; Cuban, 2017; Crischelle, 2020; Linaberger, 2018). Educational research functions to inform professional practice, local and state policy, and to further academic pathways of pursuit (Lopez-Alvarado, 2017). While bold, the stated expectations of future workplaces and the undeniable presence of technology in the patterns of everyday life drive educators to develop new school structures (Evans, 2018; Katzman & Horn, 2016). The findings from this study will be applicable from classroom practitioners, to administrators, and to school systems in better understanding how smaller innovative contexts impact student agency (Cohen, 2017; Curry & Mania, n.d.; Mameli et al., 2019). At the innovative school level, entrepreneurial educators engage in action research and constantly shift innovative learning structures to meet the needs of the upcoming generation of learners (Kapoor, 2015; Schroth, 2019; Washington, 2021; Williamson, 2018). Students report a desire to be independent and explore the acquisition of knowledge beyond the traditional brick-and-mortar classroom (Hands, 2014; Project Tomorrow, 2015). Larger schools and systems can benefit from exploring smaller educational communities, researching and applying effective MS elements in contained classroom settings within larger constructs (Cohen, 2017).

While many American families meet the educational needs of the younger generation through larger school systems run by state and federal government policies, a progressive segment of society is willing to risk a hybrid school environment to improve education (Cohen, 2017; Kessinger, 2011; Koteskey, 2018; Lopez-Alvarado, 2017; Project Tomorrow, 2015; Templeton Academy, 2018). Disappointed in the learning outcomes of publicly funded schools both academically and concerning social-emotional development, parents are opting to enroll children in private or charter schools (Crischelle, 2020; Katzman & Horn, 2016; Linaberger, 2018). Understanding how Bronfenbrenner's microsystem, as described in the Bio-ecological

Model, contextualizes alternative school environments' contributions to the body of knowledge on human development, expands on an application of the theory (Bronfenbrenner, 1979, 2007; Onwuegbuzie et al., 2013).

As a comparative study, this exploration involves an examination and comparison of two private school climates (Creswell & Creswell, 2018; Maxwell, 2013). The Bio-ecological model clearly places the school and the home at the microsystem level of influence in a developing child's life (Brendtro, 2006; Bronfenbrenner, 1977, 1979; Onwuegbuzie et al., 2013). Parents make the choice for non-public schooling for various reasons, including individualization, a community feel, a smaller school setting, a particular social philosophy, opportunities for creative expression or field work, or a release from government intervention (Cohen, 2017; Crischelle, 2020; Friedman, 1955; Potterton, 2020). Parents selecting a private education, whether an innovative MS or a CPS, tend to be in a higher socio-economic status (Potterton, 2020; Rodgers, 2014). Dissatisfied with the public school system, parents select private schools, free of government mandates, which are perceived as a better fit for individual preference (Artz, 2018; Horn, 2016; Friedman, 1955). Comparing the participant groups from two private school contexts in the early stages of studying the MS phenomenon may mitigate impacts on student perceptions from vastly differing home situations. As an initial examination of the impact of the MS environment, this study aims to minimize variation in other elements of the participants' microsystems and compare somewhat homogenous groups (Onwuegbuzie & Collins, 2007).

Examining the effectiveness of the MS in developing student agency will help educators better understand the validity of the innovative educational model (Koteskey, 2018; Veiga, 2016). An understanding of MS classroom structures and outcomes may inform teacher training curriculum on the topics of small schools, personalized learning, and innovative classroom

design (Cuban, 2017; Vinovskis, 2015). While philanthropic funding for start-up schools is criticized, gaining an understanding of the level of effectiveness of MSs may validate the funding stream, or may drive more funding to support effective innovative programs (Koteskey, 2018; Roberts-Mahoney et al., 2016; Williamson, 2018). Educational research may be utilized by regional or state legislative bodies to reform the educational landscape (Creswell & Guetterman, 2019). As a result of studying MSs, policymakers will be more informed, allowing for knowledgeable decision-making in implementing or funding innovative school models (Roberts-Mahoney et al., 2016).

One relatively small study does not provide enough data for wide application of a concept (Moriarty, 2018). Notably, this study represents one angle of inquiry regarding the budding MS model. Further research on innovative small schools' impact on the learner will be necessary to add to a current miniscule body of literature as research practice demands (Lopez-Alvarado, 2016). The MS model has helpful qualities for the advancement of educational innovations such as agility of space, flexible formats, cross-age relationships, distributed leadership and decision-making, and the nimbleness enabling quick adoption of new formats (Crischelle, 2020). A founded understanding of MS effectiveness will enable a broader application of the knowledge for educational reformers in legislative, administrative, or individual educator roles (Crischelle, 2020; Kelchtermans, 2017; Lopez-Alvarado, 2017).

Theoretical Framework

The coherence of principles established by existing theories provide a foundation for social research (Joseph & Macgowan, 2019). Mixed-methods research studies benefit from the support of a theoretical framework (Murawska & Walker, 2017; Maxwell, 2013). Urie Bronfenbrenner presents a Bio-ecological approach, or social-ecological approach, to human

development through a five-tier system (DiBenedetto & Myers, 2016; Johnson & Puplampu, 2008; O'Neill, 2015). Originally, Bronfenbrenner presented an Ecological Systems Theory, introducing four interconnected layers within a child's sphere of influence (Bronfenbrenner, 1977). Over time, the system has morphed to become known, most recently, as the Bio-ecological Model (Ashiabi & O'Neal, 2015). Each name for the system, Ecological Model, Ecological Systems Theory, Ecological Systems Model of Human Development, and other variants of the term, implies the interplay of a multi-dimensional set of influential factors (Ashiabi & O'Neal, 2015; Bronfenbrenner & Evans, 2000). This study will utilize the most recent term, the Bio-ecological Model.

The Bio-ecological Model further incorporates the concept of proximal processes, the interactivity of relational influences within a given layer of the model (Ashiabi & O'Neal, 2015; Sørlie et al., 2020). The microsystem, mesosystem, exosystem, macrosystem, and chronosystem create a tapestry, woven together to influence the process of human growth (Bronfenbrenner, 1979; Bronfenbrenner & Evans, 2000). Rather than a singular focus on environment, Bronfenbrenner's theory views human development as occurring within a complex interconnectivity of four components called the Proximal Processes Model which includes processes, person, context, and time (Bronfenbrenner & Evans, 2000; Wertsch, 2005; Sørlie et al., 2020).

No one element can stand alone and determine an individual human's personality, cognitive processes, or understanding of the world (Johnson & Puplampu, 2008; O'Neill, 2015). The microsystem, the innermost influential environment, includes the parents and family unit and possibly a religious place of worship, a school, or another organization acting to form the close daily community circle of interactions of the individual (Brendtro, 2006; Bronfenbrenner,

1977, 1979; Onwuegbuzie et al., 2013). The model identifies the interaction of both the home and school environments (Ben-Eliyaho & Bernacki, 2015; Bronfenbrenner, 1977). While the school is located amongst the closest environments, the crossover of the parents with the school personnel is also part of the mesosystem; (Ben-Eliyaho & Bernacki, 2015; DiBenedetto & Myers, 2016; Bronfenbrenner, 1977). As the systems are nested and overlapping, all must be considered in human development research (Ben-Eliyaho & Bernacki, 2015; Bronfenbrenner, 1977).

Overview of Research Methods

This is a comparative mixed-methods study providing analysis of the development of student agency. In particular the study addresses student motivation, choice, and competency in relation to student agency. A cohort of students enrolled in innovative MSs is the targeted population (Mertler, 2016). Three MSs located in the Western and Midwest regions of the U.S. with small populations of less than 150 students are compared to the control group of the study, students from upper elementary and middle school classrooms in conventionally structured, private schools. As a comparative mixed-methods study, the researcher employs the structure proved by Explanatory Sequential Design (Bowen et al., 2017; Creswell, 2012; Creswell & Guetterman, 2019; Maxwell, 2013; Wong & Cooper, 2016). The design involves an initial quantitative tool followed by qualitative focus group sessions (Mertler, 2016). Both participant groups are made up of private school students, residing in a family unit valuing school choice. The control group is made of students from a conventional classroom structure within a larger school setting, with the one similarity being the age of students, to collect data from a similar set of chronologically developed students compared with the MS settings (Maxwell, 2013; Mertler, 2016).

The quantitative portion of the study involves the use of a Likert-scale survey. The voice of students is integral in pursuing and understanding educational change (Storz & Hoffman, 2013). Middle grade students, ages nine to fourteen, from three MSs, as well as control-group CPS classrooms, are queried on a survey. Secondly, the students are invited to participate in follow up focus groups. The administration and teaching staff at each school will aid in the selection of the students. The data is collected, aggregated, and analyzed through statistical analysis of quantitative data and coding of qualitative data. A comparative analysis reveals any significant difference in the sense of motivation, competency, or choice between the two school-type groups (Creswell & Guetterman, 2019; Maxwell, 2013).

Chapter II

Review of Literature

Introduction

In an age of innovation across all industries, education is not immune to the fast-paced integration of digital technologies, novel ideas, and divergent methodologies (Batsila & Tsihouridis, 2016; Bi & Shi, 2019; Conrad, & Graham, 2017; Lochner et al., 2017; Peck et al., 2015; Project Tomorrow, 2015). The rapidly changing landscape of education and the unstoppable insertion of internet and computer technologies challenges administrators and parents to continue to adequately prepare today's learners for adult lives amid cultural transition (Hui, 2016; Patrikakou, 2016; Peck et al., 2015; Thomas & Cooper, 2016; Williamson, 2018). Education must remain student-focused (Kassem, 2019; Shannon & Bylsma, 2007; Tyack & Cuban, 1995). Some educators believe schools are no longer a secluded place for students, and the intersection of entertainment, personal pursuits, and academic learning is unavoidable and here to stay (Selwyn et al., 2017). Bronfenbrenner's Bio-ecological Model outlines a perspective of acknowledging the intertwining of influences on a child's development (Brendtro, 2006; Bronfenbrenner, 1977; Bronfenbrenner & Evans, 2000; DiBenedetto & Myers, 2016; Johnson & Puplampu, 2008; O'Neill, 2015). Venture philanthropists, viewing the cry for educational reform as an opportunity for benevolent investment through backing educational entrepreneurs, advocate radical new structures including high-tech solutions to meet the needs of learners (Koteskey, 2018; Roberts-Mahoney et al., 2015; Russo, 2017; Williamson, 2018).

Much research exists to define effective schooling in existing conventional models including public schools, religious and non-religious private schools, charter schools, and homeschooling (Peck et al., 2015; Project Tomorrow, 2015; Ravenscroft & Luhanga, 2018;

Shannon & Bylsma, 2007). Within traditional schools, the standard modes of learning are a conventional setting with a teacher delivering instruction to live students and, more recently, a mix of face-to-face teaching and some form of independent digital platforms termed "blended learning" (Bi & Shi, 2019; Ravenscroft & Luhanga, 2018; Zainuddin, 2018). Remarkably, a new division of schools is emerging, MSs (Cohen, 2017; Horn, 2016; Kapoor, 2015; Katzman & Horn, 2016; Koteskey, 2018). Typified as privately funded start-ups, MSs are driven by the viewpoint of traditional models not fulfilling the needs of the millennials, or upcoming Generation Z and Generation Alpha learners (Apaydin & Kaya, 2020; Koteskey, 2018; McCrindle, 2020; Rue, 2018; Washington, 2021; Williamson, 2018). While exciting, some thought leaders challenge the notion of reimagined small schools providing a better model for educating a modern generation of learners (Rodgers, 2014; Williamson, 2018).

Innovative models take time to implement as both teachers and students must work through a process of learning best practices (Bi & Shi, 2019; Bingham, 2017; Byers et al., 2018; Cho & Littenberg-Tobias, 2016; Deed et al., 2014). The complex interplay of different elements of a child's environment are present in MSs (Hitlin & Elder, 2007; O'Neill, 2015; Project Tomorrow, 2015). Innovative small schools are founded on the principle the best learning outcomes occur in an environment consisting of embedded meaningful connections with parents, teachers, and positive peers within a school (Brendtro, 2006; Curry & Mania, n.d.; Templeton Academy, 2018).

The purpose of this study is to examine the impact of the unique MS environment on the development of student agency in regard to motivation, choice, and competency for middle grade students (Mameli et al., 2019; O'Neill, 2015; Oluwatayo et al., 2016; Wolff et al., 2020; Wall et al., 2018). The following review of literature includes a discussion and outline of

Bronfenbrenner's Bio-ecological systems theory, a widely accepted paradigm for understanding the complexity of human development (Ben-Eliyaho & Bernacki, 2015; Brendtro, 2006; O'Neill, 2015; Wertsch, 2005). Additionally, the literature review provides context into the body of knowledge on seven essential topics related to student agency in the modern innovative classroom: 1) qualities of 21st-century students, 2) characteristics of middle grade students, 3) history of innovation in American schools, 4) emerging elements of the MS model, 5) descriptions of high-quality learning environments, 6) description of student agency, and 7) effects of educational technology on human development.

Framework: Bronfenbrenner's Ecological Systems Theory

While the field of education in modern times recognizes a need to study non-cognitive elements of learning, no tool is perfect in capturing the desired data (Bjorklund-Young, 2016; Duckworth & Yeager, 2015; Egalite et al., 2016). The complexities of measuring non-cognitive learning requires a multi-layered, multi-method approach (Duckworth & Yeager, 2015; Kiefer et al., 2015). Educational historian, Vinovskis (2015) prompts educational researchers to ensure an analytical framework takes "into consideration children's development over time within the contexts in which they live" (p. 37). Bronfenbrenner's multi-dimensional, Bio-ecological Model accomplishes exactly what Vinovksis proposes (Bronfenbrenner, 1977; DiBenedetto & Myers, 2016; Johnson & Puplampu, 2008; O'Neill, 2015; Rucinski et al., 2018).

The Bio-ecological Model emerged in the 1970s in an effort to explore the nature vs. nurture aspect of human development (Bronfenbrenner, 1977; Wertsch, 2005). For more than three decades, researchers have expounded on the original framework (Brendtro, 2006; Bronfenbrenner & Evans, 2000; DiBenedetto & Myers, 2016; Wertsch, 2005). The Bio-ecological Model has taken on a variety of monikers over the past 60 years, including, Socio-

ecological Theory, Development in Context, Human Ecological Theory, the Ecological Model of Human Development, and the Bio-ecological theory (Ashiabi & O'Neal, 2015). Initially, Bronfenbrenner (1977) established the soundness of the ecology of a classroom by declaring the validity of a context in a study is determined by the environment in which the subject is being studied having, "the properties it is supposed or assumed to have by the investigator" (p. 516). The original Bio-ecological Model introduces four layers: *microsystem*, *mesosystem*, *exosystem*, and *macrosystem* (Bronfenbrenner, 1977, 1979; DiBenedetto & Myers, 2016; Johnson & Puplampu, 2008; O'Neill, 2015). Further exploration at the turn of the century resulted in an additional layer, the *chronosystem*, relating to the natural and unavoidable element of time in human development (Bronfenbrenner & Evans, 2000; DiBenedetto & Myers, 2016).

The Bio-ecological Model recognizes the interactions of human beings, dynamic organisms, with elements in the given environments (Brendtro, 2006; DiBenedetto & Myers, 2016; Johnson & Puplampu, 2008; O'Neill, 2015). Bronfenbrenner's theory maintains no one area of study can understand human development (Brendtro, 2006). Whether anthropology, psychology, sociology, or the medical or educational fields, the lens of one singular viewpoint is too narrow (Brendtro, 2006; DiBenedetto & Myers, 2016). Bronfenbrenner criticizes an isolated view as inaccurate and labels a one-angle approach as pseudoscience (Brendtro, 2006; Wertsch, 2005). Environments are complex and consist of varying levels of sustained contact and intimate connection (Brendtro, 2006; DiBenedetto & Myers, 2016; Johnson & Puplampu, 2008; O'Neill, 2015). In fact, the Bio-ecological Model proposes children need sustained relationships with caring adults in order to develop holistically (Brendtro, 2006; Darling et al., 2020). The innermost level of the interactive layers of the Bio-ecological Model is called the microsystem (Bronfenbrenner, 1977, 1979; DiBenedetto & Myers, 2016; Johnson & Puplampu, 2008). The

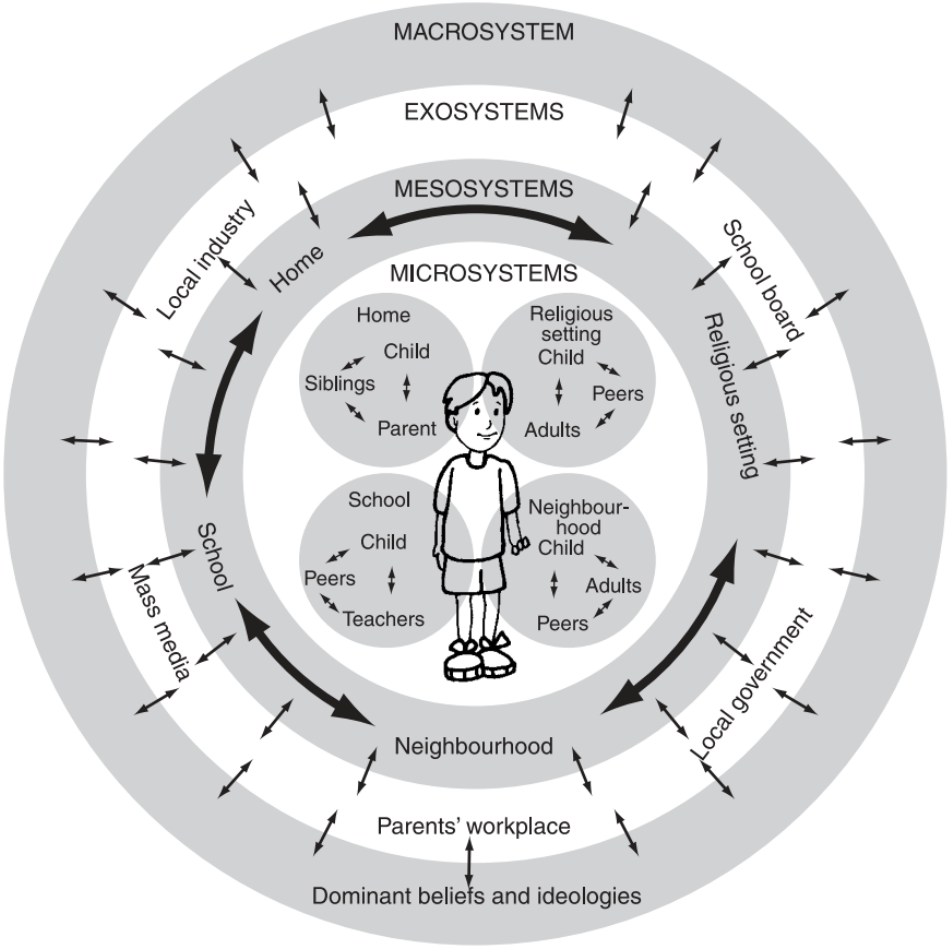
microsystem is the area of the model with the most intimate relationships and the typical environments where a child spends the majority of time (Brendtro, 2006; Bronfenbrenner, 1977, 1979; Johnson & Puplampu, 2008; O'Neill, 2015). The microsystem level includes the parents, the home, the classroom, possibly a place of worship, and close friends (Brendtro, 2006; Bronfenbrenner, 1977, 1979). Elements are delegated to the microsystem when the child has a great deal of exposure over time and is dependent on close relationships (Brendtro, 2006; Johnson & Puplampu, 2008). Parents, siblings, or others living in the home would be part of the microsystem (Brendtro, 2006; Bronfenbrenner, 1977, 1979). Some recent researchers suggest the internet has become an element of today's children's microsystem due to the platform's continuous presence through sustained connectivity (Johnson & Puplampu, 2008).

The mesosystem is the interplay of the individuals representing the different spheres of influence (Bronfenbrenner, 1977; DiBenedetto & Myers, 2016). For example, the interaction of a teacher with a parent occurs in the mesosystem level. The mesosystem is not a set of locations, rather a set of interactions (Bronfenbrenner, 1977). The exosystem consists of the broader systems in the child's immediate community (Bronfenbrenner, 1977; Johnson & Puplampu, 2008). The exosytem further includes the city systems and local areas such as library or the system of purchasing items in the local market (Brendtro, 2006; Bronfenbrenner, 1977). While the classroom, teacher, and peers are part of the microsystem, the actual school and protocols within the larger framework of operations of the school are part of the exosystem (Bronfenbrenner, 1977, 1979). Again, the exosystem also consists of the interactions of the elements of the child's world, the broader levels and roles within the outer systems connecting with individuals and influences closer to the child (Brendtro, 2006; Bronfenbrenner, 1977, 1979; Johnson & Puplampu, 2008).

The macrosystem is the largest sphere of the model (DiBenedetto & Myers, 2016). The outer layer consists of the structures comprising the child's larger culture (Bronfenbrenner, 1977; DiBenedetto & Myers, 2016). The macrosystem includes the economy, social issues, political initiatives, and national customs (Bronfenbrenner, 1977; DiBenedetto & Myers, 2016; Leithwood & Azah, 2017). The indirect influence of the macrosystem has a meaningful impact on the developing human (Bronfenbrenner, 1977; DiBenedetto & Myers, 2016; Ravitch & Riggan, 2017). Spanning each of the four prior systems, the chronosystem implicates time (Bronfenbrenner & Evans, 2000; Johnson & Puplampu, 2008). Children are born within a particular era. There are world events, as well as regular processes of physical maturation occurring over time (Bronfenbrenner & Evans, 2000). The time frame in which a child lives impacts the individual's development (Bronfenbrenner & Evans, 2000). Figure 1 displays a model of Bronfenbrenner's Bio-ecological Model, entitled by Penn (2005) the Ecological Model of Child Development. The model demonstrates the school existing at the crossover of the microsystems and mesosystems layers (Penn, 2005).

Figure 1

Bronfenbrenner's Bio-ecological Model



Note: From Penn (2005). Understanding early childhood: Issues and controversies. Open University Press. p. 45.

Bronfenbrenner's Bio-ecological Model is explained through the term proximal processes (Bronfenbrenner & Evans, 2000; O'Neill, 2015; Sørlie et al., 2020). The initial proposition lays out the concept of proximal processes as the regular and reciprocal interaction of a maturing human and one's environment, including other individuals, objects, experiences, and symbolic elements (Bronfenbrenner & Evans, 2000; O'Neill, 2015; Sørlie et al., 2020). The interactions must occur at a regular rate over certain periods of time to have the greatest impact

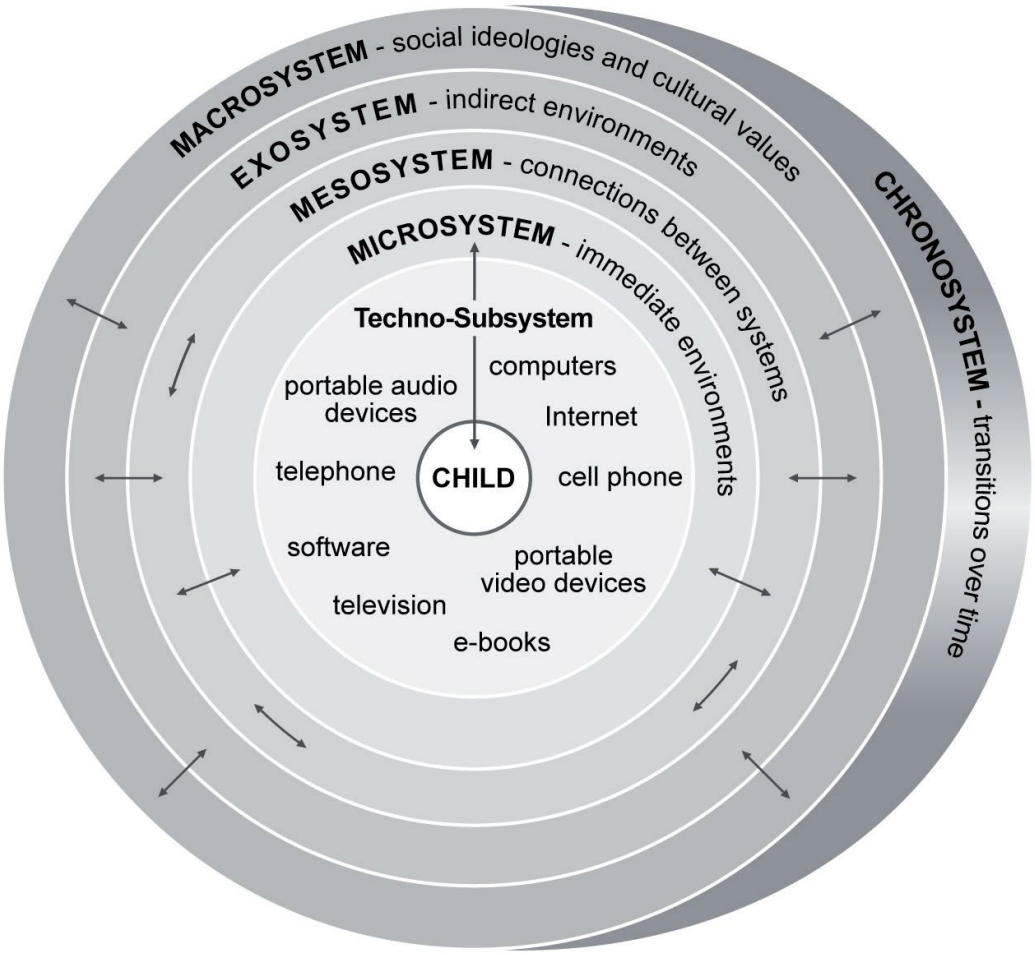
(Bronfenbrenner & Evans, 2000; O'Neill, 2015). The environment and the subject interact with regularity through processes occurring in close proximity to one another in time and in shared physical spaces (Bronfenbrenner & Evans, 2000; O'Neill, 2015). Proximal processes are dichotomous, falling into one of two camps, either competent or dysfunctional (Bronfenbrenner & Evans, 2000). Competency, considered a non-cognitive trait, is an acquisition of behaviors or traits stemming from a variety of intellectual, artistic, physical, motivational, or social situations leading to positive results (Bronfenbrenner & Ceci, 1994; Bronfenbrenner & Evans, 2000; Bjorklund-Young, 2016). Dysfunction results from difficulties occurring due to a development of negative traits from variant domains (Bronfenbrenner & Evans, 2000). The level of exposure impacts the depth of effect. Exposure can be measured in duration, frequency, interruption, timing, and intensity (Bronfenbrenner & Ceci, 1994; Bronfenbrenner & Evans, 2000).

There are concerns surrounding the amount of consistent exposure to the internet and digital platforms (Livingstone et al., 2012; Meyer, 2018; Meyers, 2009; Uhls et al., 2014). O'Neill (2015) proposes the consideration of an extension of Bronfenbrenner's Bio-ecological Model to include a technology aspect, as originally the model focused mainly on human relationships in the environment. Educators and parents are justified in studying the impacts of small school models utilizing educational technology as a frequent mode of instruction and embeded opportunities for relationships with teachers and peers in a small community (Bronfenbrenner & Evans, 2000; Byers et al., 2018; Crischelle, 2020; Darling et al., 2020; Johnson & Puplampu, 2008). Middle school aged students are in a socially, psychologically uneasy, and malleable stage of life (Akos, 2004; Harter, 1982). As technology becomes integral to the microsystem of preteens and young teens, a consideration for the impact on human development is warranted (Cho & Littenberg-Tobias, 2016; Evans, 2018; Jha, 2020). Figure 2

demonstrates the centrality of the techno-subsystem for the 21st-century learner (Johnson & Puplampu, 2008).

Figure 2

The Ecological Techno-Subsystem



Note: From *Internet Use During Childhood and The Ecological Techno-Subsystem*, by Johnson & Puplampu, 2008. Copyright 2008 by the Canadian Journal of Learning and Technology. Used as an open source under a Creative Commons Attributions License.

Qualities of 21st-Century Students

Learners of the 21st-century bring a new set of challenges to traditional school settings, including continuous access to the web, a high level of expertise in digital device usage, and increased distractibility (Rue, 2018). Today's learners are a combination of Generation Z students, born after 1995 and Generation Alpha, born after 2010 (Apaydin & Kaya, 2020; McCrindle, 2020; Schroth, 2019; Washington, 2021). Gen Z children were raised in overprotective homes, are emotionally fragile, and demand safe environments (Rue, 2018; Schroth, 2019). Generation Z, comprising nearly two billion of the world's population, tend to be career focused, economically conservative, environmentally conscious, somewhat anxious, advocates for social justice issues, and idolizers of world changers (Richardson, 2019; Rue, 2018; Schroth, 2019; Seemiller & Grace, 2017; Southgate, 2017). Growing up in an age of domestic terrorism and high-profile school shootings, Generation Z has a heightened awareness of the need for safety and have lived in the protective oversight of parents and security protocols (Rue, 2018; Schroth, 2019; Seemiller & Grace, 2017). Generation Alpha was born into a tech-rich environment (Apaydin & Kaya, 2020; McCrindle, 2020; Washington, 2021). For children of Millennials and older Gen Zers, personal electronic devices have dominated the context of home and the community since birth (Apaydin & Kaya, 2020; McCrindle, 2020). Educators are unclear how to embrace new-learner qualities to encourage student achievement (Apaydin & Kaya, 2020; Bellur et al., 2015; Buzzetto-Hollywood & Alade, 2018; Cavanagh, 2015; Hui, 2016; Ingalls, 2017; Lemley et al., 2014; McCrindle, 2020; Miller et al., 2016; Patrikakou, 2016; Zhou et al., 2017).

Diverse. The current generation of American learners is a more diverse in race, ethnicity, religion, and gender than any preceding generation in the U.S., and possibly other nations (Jha,

2020; Rue, 2018; Schroth, 2019; Tarbutton, 2018). Children born after 1997 are just over 50 percent White, more than 20 percent Hispanic, 14 percent Black, and less than 5 percent two or more races (Kane, 2017; Rue, 2018). The Alphas will grow to be more culturally diverse than even Gen Z (Jha, 2020; McCrindle, 2020; Washington, 2021). Through the internet and social media, students today have the opportunity for global connections and contributions not available to prior generations (Apaydin & Kaya, 2020; DiBenedetto & Myers, 2016; Jha, 2020; Rue, 2018; Tarbutton, 2018; Washington, 2021). Generation Z, distinctively diverse, feels strongly about equality and stands for social justice issues regarding prejudice and racism (Rue, 2018; Schroth, 2019). By the 2030s Generation Alpha will have the largest population of members globally and the largest middle-class section of the cohort will be of Asian descent (McCrindle, 2020). Generation Alpha will also live in more diverse family units, including single-parent homes and unmarried parents (Washington, 2021).

Expect choice. Students expect to be included in decisions about all aspects of life (Kapoor, 2015; Schroth, 2019; Tarbutton, 2018). Members of the younger generations have only known a way of life offering entitlement to make choices (Apaydin & Kaya, 2020; Southgate, 2017). Differentiation and individualization are made possible with technology and students are accustomed to customization based on one's choices and preferences (Deed et al., 2014; Tarbutton, 2018). Students know teachers have the capability to customize, so choice is expected (Schroth, 2019; Tarbutton, 2018). Technology solutions to enhance teaching and learning in schools are even designed and found by 21st-century students (Hefty, 2014; Rue, 2018). Knowing how to find ways to learn and spending time selecting what to learn, Alphas and Generation Z experience choice even beyond the classroom (Apaydin & Kaya, 2020; Kapoor, 2015; Whitehead, 2017). A body of research reiterates the importance of today's educators to

listen to the learners when shaping classroom experiences, embracing values of connection, autonomy, and relevance (Apaydin & Kaya, 2020; Jacobi, 2018; Lemley et al., 2014; Montenegro, 2019; Zainuddin, 2018).

Tech-savvy. For preteens and teens, device usage is a way of life (Apaydin & Kaya, 2020; McCrindle, 2020; Peck et al., 2015; Schroth, 2019; Washington, 20211). Today's students take smartphones and streaming videos for granted (Apaydin & Kaya, 2020; Buzzetto-Hollywood & Alade, 2018; McCrindle, 2020; Rue, 2018). The term Glass Generation is also used as a title for the Alpha Generation due to the constant interaction with glass-covered screens (Washington, 2021). The parents of young children view technology and a social media presence as an important element of life of the child (Washington, 2021). For a modern generation, wi-fi access at every location in the world is an assumption and expectation (Apaydin & Kaya, 2020; Peck et al., 2015; Rue, 2018; Selwyn et al., 2017; Washington, 2021). Students view the one-to-one system as an opportunity, even a right, to bring the multiple layers of life into the classroom (Selwyn et al., 2017; Tarbutton, 2018; Bulfin et al., 2016). As cohorts, both alphas and Generation Z are creative and expect innovation (Apaydin & Kaya, 2020; Southgate, 2017). Possessing anticipation for tech updates and early adopters in innovative technologies, today's students are tech-savvy and eager to utilize technology while learning (Apaydin & Kaya, 2020; Buzzetto-Hollywood & Alade, 2018; Rue, 2018; Tarbutton, 2018). Sometimes students are disrupted or find ways to work around teachers' management strategies, continuing to use personal devices for texting, watching videos, and playing games, even during designated learning time (Cho & Littenberg-Tobias, 2016; Selwyn et al., 2017). Generation Z reports a perceived value of utilizing and continuing to learn about technology both now and in future

employment (Buzzetto-Hollywood & Alade, 2018; Schroth, 2019; Meyers, 2009; Seemiller & Grace, 2017)

The first digital natives, the Millennials, began college in the early 2000s, while current teens, or Generation Z, are attending secondary schools now or about to enter college (Buzzetto-Hollywood & Alade, 2018; Prensky, 2001; Rue, 2018; Schroth, 2019). The Alphas are now in elementary and early middle schools and within the decade will enter college and the workforce (Apaydin & Kaya, 2020; McCrindle, 2020). While the cohorts born into the digital age share some unique formative experiences, some researchers question the accuracy of labeling all members as digital natives, recognizing the spectrum of individual capabilities (Bennett et al., 2008; Bingham, 2017; Prensky, 2001; Patrikakou, 2016; Rue, 2018). Generation Alpha members worldwide have consistent digital exposure and access (Apaydin & Kaya, 2020; Jha, 2020; McCrindle, 2020). Identifying a potential risk of assuming individuals possess the same skills, other research divides young learners into three groups, digital wanderers, digital rebels, and e-learning pioneers (Peck et al., 2015). As a group, teens may be digital natives, but to assume individual students possess the flexibility and autonomy to succeed in academic pursuits could be an oversight (Bingham, 2017; Prensky, 2001). Adults must plan a scaffold to develop students to become motivated, self-directed learners (Apaydin & Kaya, 2020; Bingham, 2017; Kleden, 2015; Schroth, 2019). Creating categories for 21st-century learners assists school-level policy makers and teachers to better respond to the task of integrating technology in the modern classroom (Peck et al., 2015; Project Tomorrow, 2015).

Digital communication. Access is an assumed function from personal media devices, as students expect to exchange information 24/7 in almost any location (Rue, 2018; Schroth, 2019; Tarbutton, 2018). Related to school, students expect access to class information at any time

(Rodriguez-Gomez et al., 2018; Tarbutton, 2018). For Generation Z an increase in virtual communication styles supplants traditional verbal, face-to-face communication, which relies heavily on facial cues and non-verbal body language (Schroth, 2019; Uhls et al., 2014; Zhou et al., 2017). Today's students are less likely to interact with print publications, television, and radio (Southgate, 2017). Digital text messaging has decreased face-to-face interactions and educators fear negative impacts such as a loss of young people's ability to sustain personal, meaningful conversations (Apaydin & Kaya, 2020; Bellur et al., 2015; Rue, 2018; Schroth, 2019). Since social-emotional interactions are a regular part of the daily human experience, any concern children may not develop vital communication skills at a proficient level is worth exploring (Apaydin & Kaya, 2020; Darling et al., 2020; Meyer, 2018; Meyers, 2009; Ravitch & Riggan, 2017; Uhls et al., 2014; Zhou et al., 2017).

The Bio-ecological Model recognizes the possible impact of all elements of a child's environment including the constancy of technological communication (Bronfenbrenner, 1977; Johnson & Puplampu, 2008; O'Neill, 2015). Generation Z learners have developed a need for immediate acceptance and validation from social media (Buzzetto-Hollywood & Alade, 2018; Rue, 2018). Both alpha and Gen Z children prefer images for communication, such as emojis and gifs to only text (Apaydin & Kaya, 2020; Rue, 2018; Schroth, 2019). Research indicates 83 percent of teens claim social media provides a sense of stronger peer connections (Przybylski & Weinstein, 2017). A full 68 percent of adolescents report having experienced support through online friends during a difficult time in life (Przybylski & Weinstein, 2017). Some young people feel less supported in physically close human relationships and turn to a virtual network to find connection (Apaydin & Kaya, 2020; McCrindle, 2020; Zhou et al., 2017). Interestingly, Generation Z students also appreciate face-to-face interactions with teachers (Hamad, 2017;

Jacobi, 2018). The need for a human element may not be substantially different than other generations (Bennett et al., 2008; Hamad, 2017; Jacobi, 2018; Luo et al., 2019; Quinn, 2015).

Screen time. Today's young adolescents spend four to seven hours online each day on screens, including television, computers, gaming, and texting (Patrikakou, 2016; Uhls et al., 2014). The American Academy of Pediatrics suggests a limitation of screen time (Washington, 2021). Data reveals 85 percent of students watch online videos to learn new skills (Rue, 2018). Public concern exists proposing massive exposure to screen time will negatively impact a generation, while an alternate view promotes the benefits of early interactions such as advancing digital and visual literacies (DiBenedetto & Myers, 2016; Johnson & Puplampu, 2008; Livingstone et al., 2012; Meyer, 2018; Meyers, 2009). The concern remains engaging in media driven activities takes away from time the young person would spend on social or other active opportunities (Apaydin & Kaya, 2020; Przybylski & Weinstein, 2017; Meyers, 2009). Given the steep rise in the amount of time young learners spend with media devices since the turn of the century, educators are prudent to understand technology's impact, if any, on the maturation process (Apaydin & Kaya, 2020; Przybylski & Weinstein, 2017; Schroth, 2019; Uhls et al., 2014; Washington, 2021).

Multi-tasking. Digital natives expect to work in the cognitive juggling of completing schoolwork while simultaneously engaging with multiple devices (Bellur et al., 2015; Buzzetto-Hollywood & Alade, 2018; Schwieger & Ladwig, 2018; Selwyn et al., 2017). Both male and female students report multi-tasking as a trait of the young generation (Bellur et al., 2015; Selwyn et al., 2017). Virtually all teens own smartphones or other personal media devices and use words such as "lifeline" and "personal secretary" to describe handheld technology (Bulfin et al., 2016; Buzzetto-Hollywood & Alade, 2018; Peck et al., 2015; Southgate, 2017). The

Generation Z and Alpha cohorts enjoy the constant advance of features on technological devices (McCrindle, 2020; Southgate, 2017). Gen Z students use multiple e-learning platforms from digital textbooks to podcasts and game-like learning applications (Rue, 2018; Selwyn et al., 2017). Students attempt to complete various tasks concurrently during independent and structured learning activities by texting, engaging social media, internet browsing, and watching or listening to videos and music (Bellur et al., 2015; Schroth, 2019; Selwyn et al., 2017; Southgate, 2017). Current studies indicate multi-tasking, while stated as a value of Generation Z learners, may be detrimental to learning outcomes (Bellur et al., 2015; Ophir et al., 2009; Schroth, 2019). Alpha generation students are not currently noted as being as high-level multi-taskers compared to the immediately preceding generation (Apaydin & Kaya, 2020). Students expect teachers to function in the same way, using several applications and platforms simultaneously (Buzzetto-Hollywood & Alade, 2018; Rue, 2018). Students also self-report a need for live teacher support (Hamad, 2017; Lochner et al., 2017; Quinn, 2015). Early research on digital multi-tasking while doing schoolwork reveals a cost to the multi-tasking learner, more time needed to master a concept and overall lower academic achievement (Bellur et al., 2015; Ophir et al., 2009).

Information junkies. Constantly inundated with information, the young tech-savvy generations are able to filter massive amounts of data and sort out pertinent information (Bellur et al., 2015; Rue, 2018). However, students are not proficient at identifying credible sources or with skills such as questioning the validity of internet posts (Buzzetto-Hollywood & Alade, 2018; Meyer, 2018; Rue, 2018). Tech users hide behind fake accounts on social media and embrace anonymity to controversial content (Apaydin & Kaya, 2020; Rue, 2018). Students are connected to streaming information even while engaging in formal learning activities, including

video streaming and surfing the web (Bellur et al., 2015; Selwyn et al., 2017). As a group, today's students take in an abundance of bits of information yet avoid magazines, newspapers, and reading novels for pleasure (Rue, 2018). Continuous engagement with information at such a rapid pace and enormous quantity may have an unknown effect on the cognition and development of young learners (Buzzetto-Hollywood & Alade, 2018; Christakis et al., 2018; Ophir et al., 2009).

Characteristics of Middle Grade Students

Middle grade students, preteens and young teens with approximate ages of 9 – 14, present unique developmental characteristics (Meyers, 2009). Middle school may be an exciting and budding stage of life (Bishop & Harrison, 2021). Metacognition and self-awareness are awakening in the mind of young teens (Bishop & Harrison, 2021). The age-group members are at risk for negative behaviors and lack of academic progress (Finigan-Carr et al., 2014; Kiefer et al., 2015; Sørlie et al., 2020; Stark et al., 2018). Research indicates middle school age students are especially susceptible to floundering in the transition to a different learning structure, moving from a generally singular, smaller, more controlled social situation, to a more populous, socially complex environment (Akos, 2004; Batsila & Tsihouridis, 2016; Kim et al., 2014; Stark et al., 2018; Wolff et al., 2020). Students in the middle grades are at a higher risk of lacking school engagement than other age groups (Quinn, 2015). Development at the preteen stage in life involves a complex set of overlapping variables of maturity, including the physical, emotional, cognitive, and psychological growth as a person (Akos, 2004; Bronfenbrenner, 1977; Sørlie et al., 2020; Wolff et al, 2020). Middle school students increase the capacity to exhibit autonomy and self-direction as learners (Wall et al., 2018). The factors of a school climate greatly impact the development of the individual (Kiefer et al., 2015; Kim et al., 2014; Sørlie et al., 2020; Wolff

et al., 2020). In a learning setting, the goal of academic achievement does not exist in seclusion (Duckworth & Yeager, 2015; Stark et al., 2018). Peer influence, social status, body image, self-identity, self-confidence, and a budding awareness of one's metacognition are at play simultaneously (Akos, 2004; Bishop & Harrison, 2021; Kiefer et al., 2015; Meyers, 2009; Wolff et al., 2020). The awakening of the awareness of self, combined with the awareness of peer opinion, causes self-evaluation and the establishment of personal worth and competency (Harter, 1982; Wolff et al., 2020). Self-discovery results in an enhanced understanding of one's personality and social-self (Meyers, 2009). Students in the middle grades begin to perceive the extent of available personal social support from family, faith communities, friends, and peers (Meyers, 2009; Sørlie et al., 2020).

The History of Innovation in American Schools

Historians have lent valuable insights to understand intentions and outcomes of reform movements in the United States education system (Kessinger, 2011; Vinovskis, 2015). The American educational system, driven by top-down mandates to improve, is built on integrating innovative ideas, yet often provides limited resources for the school context (Howell & Magazinnik, 2017; Paunesku et al., 2015; Tyack & Cuban, 1995). American leaders and policymakers repeatedly devise prescriptions to address the changing economic and social landscape and then task schools to carry out the reforms (Pedersen, 2012; Tarbutton, 2018; Tyack & Cuban, 1995; Vinovskis, 2015). The specific activities in American classrooms over the first half-century of the 1900s is not well understood (Gitomer & Bell, 2016). For the past five decades, education has become focused on the economic benefits of increasing the skills of citizens (Hanushek et al., 2017; Kessinger, 2011; Mulnar, 1997; Smith, 2005). The field of education does not exist in a secluded realm but has been and will continue to be influenced by

the contemporary technologies of each period (Bennett et al., 2008; Meyer, 2018; Mulnar, 1997). Today, technology innovations of the Digital Information Age lead the trends in fixing education (Meyer, 2018; Peck et al., 2015; Templeton Academy, 2018; Williamson, 2018).

Colonial times through the 19th century. Education of young people has been an American value since the first colonies of the 17th century (Adams et al., 1941; Chen, 2018; Rury, 2013; Vinovskis, 2015). Harvard was founded in 1636 (Adams et al., 1941). In 1635, the first Massachusetts public school, funded by tax monies, opened (Chen, 2018). As early as 1647, Massachusetts mandated all settlements over 50 people to establish a school, although not all colonist children attended the provided schools (Adams et al., 1941; Chen, 2018; Rury, 2013). Early Massachusetts also opened early childhood schools for preschool age settlers and provided year-round education (Pedersen, 2012; Vinovskis, 2015). Early educational institutions were broadly attended, which was a divergent philosophy from the Old World, education-for-the-elite society, back in Europe (Rury, 2013). The purpose of schooling was to uphold the principles of religion and capital laws (Adams et al., 1941; Chen, 2018; Green et al., 2006; Sass, 2021; Spring, 2017). Rural schools were mainly the one-room schoolhouse format with a multi-age student group meeting less than 100 days a year or private tutors hired to come to the home (Adams et al., 1941; Kramer, 2018; Pedersen, 2012; Rury, 2013). The infant American society valued a religious education so students would formally learn homogenous values aligned with the home and community (Adams et al., 1941; Chen, 2018; Rury, 2013). The purpose of the school was to extend and proliferate the same thoughts and ideas, rather than to promote social change (Adams et al., 1941; Chen, 2018; Gitomer & Bell, 2016; Rury, 2013; Spring, 2017). School curriculum promoted the idea young men should be moral thinkers with a strong work ethic (Adams et al., 1941; Sass, 2021). As the country grew, basic competencies in math and literacy became

economically advantageous for communities, so acumen in core subjects became a part of the local school curriculum (Rury, 2013). Furthermore, apprenticeships gained popularity for settlements of farmers and towns which also needed merchants and tradesmen for society to survive (Adams et al., 1941; Rury, 2013). The apprenticeship system involved a master taking on an understudy for seven years, turning out an expert in the selected industry (Adams et al., 1941).

In the time, thought leaders like Benjamin Franklin and Christian Wolff began propagating a belief in the study of classical philosophy, secularism, science, and human reason (Sass, 2021; Vinovskis, 2015). Franklin founded the first public academy in 1751 and emphasized the value of children learning useful concepts in school beyond basic reading, writing, arithmetic, and biblical knowledge (Adams et al., 1941). Other American innovations were Noah Webster's *American Spelling Book*, still in print today, and the McGuffey series readers, in print for 75 years (Adams et al., 1941; Sass, 2021). Educational institutions morphed to meet the felt economic and social needs of the people (Pedersen, 2012; Rury, 2013). Subjects such as swimming, wrestling, commerce, general history, and natural philosophy were added to school curriculum (Adams et al., 1941). In the southern states of early America, plantation owners would pay tuition to private schools for the children's education (Adams et al., 1941). Some towns struggling with transportation to schools, created "moving schools" which set up in different areas of town periodically to be accessible to different groups of students (Adams et al., 1941).

In 1796 "An Act to Establish Public Education" passed in Congress and called for greater access to knowledge and a comprehensive plan for a public education system (Sass, 2021). In the early 1800s, the American population grew, spread, and enhanced the need for access to adequate schools (Rury, 2013). The Revolutionary War had disrupted education, and illiteracy

was rampant (Adams et al., 1941). A burgeoning urban population perpetuated social problems such as crime and destitution (Rury, 2013). A revival of education in America began around 1830 (Adams et al., 1941). Schools were seen as a place for young people to gain skills to add to society rather than learn ways to reform the world (Gitomer & Bell, 2016; Rury, 2013). City leaders thought impoverished people were unable to teach the correct morals for citizenship, and the responsibility was relegated to schools (Rury, 2013). The Lancastrian structured school emerged, promoting order and efficiency, preparing students for future factory work in an industrial society (Rury, 2013). The innovative structure of an orderly, factory-like model was the beginning of modern school (Rury, 2013; Koteskey, 2018; Templeton Academy, 2018). Attendance was still relatively low, and many children worked in factories rather than becoming educated (Rury, 2013). In 1801 the innovative mounted classroom blackboard, writeable with chalk and erasable, was invented and with delivery from the steam engine train, within a few decades every classroom in America was transformed with a fabricated slate board on the wall (Buzbee, 2014; Sass, 2021). Educational reform was a response to society's changing economic and social needs and the insertion of available invented structures to prepare children for an industrialized society (Buzbee, 2014; Rury, 2013; Templeton Academy, 2018). Education was intended to give knowledge and train young people for usefulness in society (Lopez-Alvarado, 2017).

Industrialization continued to spread, along with the need for a larger well-equipped workforce into the 19th century (Rury, 2013). In 1837 Horace Mann was appointed secretary to the Board of Education in Massachusetts (Adams et al., 1941). Mann was a proponent of free education for all students and established the construct of Normal Schools for teacher training (Adams et al., 1941). The population of the cities and new territories also added diversity to the

nation, and an expanded miscellany of people groups demanded schools to handle the conflicts of belief systems and values (Rury, 2013). Schools became the place to train younger citizens to embrace diversity and change (Rury, 2013). Innovations in computing and communication such as Charles Babbage's analytical engine and Samuel Morse's electrical telegraph use of Morse Code were advancing society (Meyer, 2018). Progressive movements in school change were both pedagogical and administrative, looking at the curricular content and structure of school (Adams et al., 1941; Rury, 2013). In 1867 the United States Department of Education was established to support the growth of effective school systems (Chen, 2018; Kessinger, 2011; Sass, 2021).

The 20th century. The cusp of the 20th century yielded two foundational national documents to drive the broader field of education, rather than just at the community level: the Report of the Committee of Ten in 1893 and the Cardinal Principles of Secondary Education in 1918 (Rury, 2013). The modern high school was formalized to include six academic curricular areas and was designed to bring diverse students together to one institution (Adams et al., 1941; Rury, 2013). The standardization of schooling was to provide access to a greater percentage of the population and ensure equitable opportunities as the nation grew (Adams et al., 1941; Michelman, 2018; Rury, 2013). The public-school format settled on a six-year elementary school, a three-year junior high, and a three-year high school (Bishop & Harrison, 2021; Adams et al., 1941). In 1906, the Carnegie Unit, or required seat time for high school credit, was established to validate secondary school learning (Tyack & Cuban, 1995). Innovative school models arose as a response to highly structured mandates with variant models, such as the first Montessori school in 1913, offering a more open, learner-driven structure (Sass, 2021).

Over the past one-hundred twenty years, American school reform has been driven by educational philosophies and human development, along with a desire for the next generation to

succeed in carrying on a way of life in a democratic society as economic contributors and participating citizens (Chen, 2018; Hanushek, 2017; Michelman, 2018; Sass, 2021; Tyack & Cuban, 1995; Vinovskis, 2015). In 1900 only one in ten American teens was enrolled in high school. Just over a century later the ratio neared 100 percent (Tyack & Cuban, 1995). By 2014, the percent of American youth who earned a high school diploma had climbed to above 85 percent (Michelman, 2018). The era presented a consistent push for schools to be more inclusive in both facets of gender and racial equality (Spring, 2017; Rury, 2013). Brown v. the Board of Education called for desegregation and was a bold step toward equity in the nation's education system (Michelman, 2018; Sass, 2021; Smith, 2005). Many White Americans moved out of cities with the rise of new suburban communities, causing a racial divide with urban schools crowded and mainly populated by underprivileged minority groups (Spring, 2017; Rury, 2013). Schools became a platform to desegregate society (Michelman, 2018; Rury, 2013). Innovation in computing machines and communication continued in the development of Alan Turing's Universal Turing Machine and the implementation of the electronic point-contact transistor by AT & T in the '30s and '40s (Meyer, 2018). The mid 1940s marked the first integration of computers in education with the Mark I at Harvard and the ENIAC at the University of Pennsylvania (Molnar, 1997). Political standing, global comparisons, economic concerns, and societal advancements drove educational reform and innovation (Hanushek, 2017; Pedersen, 2012; Spring, 2017; Tyack & Cuban, 1995; Vinovskis, 2015). In 1959, PLATO, a large-scale computer project was launched through the University of Illinois (Molnar, 1997). Societal concerns about media impacts on human development date back to the early 20th century (O'Neill, 2015; Peck et al., 2015). Cinema, radio, and television were the first media platforms studied for impacts on growing minds (O'Neill, 2015).

In the postwar era until 1970, formalized education came to be an expected part of a young American's life (Michelman, 2018; Rury, 2013). A string of innovative developments hit the education field in the '60s and '70s (Sass, 2021). Urie Bronfenbrenner presents the Bio-ecological Model as an explanation of the complex intermingling of the elements of a child's life relationships and environments (Bronfenbrenner, 1977; Wertsch, 2005). College attendance became a standard goal for older adolescents (Michelman, 2018; Rury, 2013). Even early childhood education was normalized as President Lyndon Johnson proclaimed a War on Poverty initiative (Michelman, 2018; Smith, 2005). John Kemeny and Thomas Kurtz developed the computer language BASIC to help university students at Dartmouth have direct interaction with a large computer (Molnar, 1997). At the same time at Stanford University, a team developed self-paced individualized lessons in math and reading (Molnar, 1997). In 1965 the innovative Head Start program, a publicly funded early childhood program for low-income families, was initiated by President Johnson and included Bronfenbrenner's involvement (Brendtro, 2006; Howell & Magazinnik, 2017; Kessinger, 2011; Sass, 2021; Smith, 2005; Vinovskis, 2015; Wertsch, 2005). The mid '60s saw the development of the Elementary and Secondary Education Act (ESEA) intended to provide equity across socio-economic lines (Michelman, 2018; Smith, 2005). Magnet schools opened in mid-20th-century era of education (Prieto et al., 2018). The first magnet school opened in 1968 in Tacoma, Washington, an innovative model focusing on curiosity, open-mindedness, and reflection (Sass, 2021). A Yale University professor, James Comer, introduced a high school reform movement, the Comer Process (Smith, 2005). As a contemporary of Bronfenbrenner, Herbert Kohl also explored holistic learning in 1969, promoting an open classroom structure (Penn, 2005; Sass, 2021). The first innovative Career Academy opened in 1969 in Philadelphia, extending to 16 more alternative model schools by

1991 (Sass, 2021). The foundation of technological advancements for literacy began in 1971 when Michael Hart published the first e-book (Sass, 2021). The company, Texas Instruments, created handheld calculators usable innovative teachers in the classroom (Sass, 2021). By 1974 more computers were in use by more than two million students (Molnar, 1997). In 1975, Newsweek published *Why Johnny Can't Write*, fueling a debate about the quality of modern schools while launching the back-to-basics movement (Sass, 2021). Advances in technology ramped into high gear with the innovations of monolithic integrated circuitry, the Apple 1 personal computer, and the opening of Intel and Microsoft (Meyer, 2018). The personal computer era had arrived, and Apple Inc. introduced the Apple IIe to American schools as an innovative format for simulations in the classroom, including *Oregon Trail* in 1977 (Molnar, 1997; Sass, 2021).

The *Nation at Risk,* published in 1983, produced fear in the heart of politicians and parents concerned American schools were far behind foreign counterparts (Kessinger, 2011; Smith, 2005; Pedersen, 2012; Tyack & Cuban, 1995). The American children's education would be lower quality than what the previous generation had experienced (Kessinger, 2011; Tyack & Cuban, 1995; Sass, 2021; Smith, 2005). A comparison of United States student scores to students on the international stage led to a demand for reform at the national level (Kessinger, 2011; Tyack & Cuban, 1995). A panic drove schools to require more hours of instruction, more homework, more standardized tests, the addition of Computer Science to high school requirements, and a call for improved teacher training (Sass, 2021; Tyack & Cuban, 1995). The singular measure of school success became standardized test scores resulting in schools becoming a competitive platform for individual gain and a way to show other nations the strength of a future America (Hanushek, 2017; Tyack & Cuban, 1995). Educational reform was

driven by political, economic, and societal woes (Michelman, 2018; Tyack & Cuban, 1995; Vinovskis, 2015). Rather than innovations, schools leaned on administrative and structural honing to raise test scores (Hanushek et al., 2017; Tyack & Cuban, 1995). Some families lacked trust in the educational system and set out as pioneers in the homeschool movement of the ‘80s and ‘90s (Sass, 2021). Society relied on legal acts to drive change, including Public Law 105-332, to increase opportunities for vocational-technical education, the Massachusetts Education Reform Act, Americans with Disabilities Act, and Improving America’s Schools Act, to increase opportunities for vocational-technical education (42 U.S.C. § 12101, 1990; IASA, 1994; MERA, 1993: PL 105-332, 1998; Michelman, 2018; Sass, 2021).

Technological developments would rapidly shape the nation’s schools a decade before the turn of the century (Molnar, 1997; Sass, 2021). The University of Phoenix established a structure for online college degrees in the organization’s plan for an online campus in 1989 (Sass, 2021). In 1990, Tim Berners-Lee wrote HTTP, allowing two computers to communicate. Thus, the internet was launched, opening exponential innovation opportunities for education for the next 30 years via the World Wide Web (Meyer, 2018; Sass, 2021). In 1991, David Kerns, Xerox’s former CEP, founded New American Schools, an organization based on public-private collaboration to promote research-based practices in the classroom (Smith, 2005). Minnesota passed the first charter school law, allowing state funds to flow to innovative school models, opening City Academy High School in 1992 (Chen, 2018; Sass, 2021; Smith, 2005). In December of 1993 Walter Annenberg announced his *Challenge to the Nation* and provided a $500 million grant for public school reform (Annenberg, 1998; Smith, 2005). CompuHigh was the first online high school opening in 1994, along with Netscape’s launch of Mozilla 1.0 (Sass, 2021). The same year, Dave Levin and Mike Feinberg unveiled the KIPP system, the Knowledge

is Power Program, with a focus on developing character and setting high expectations for academic achievement (Jessen & DiMartino, 2020; Smith, 2005).

The first two decades of the new millennium. Even outside the United States, the 21st-century has brought a new emphasis on openness, flexibility, customization of lessons, social dynamics, and collaboration in education (Sigurðardóttir & Hjartarson, 2016). At the turn of the century, school structures with moveable boundaries, furnishings, and open areas, rather than closed classrooms, were trending (Sigurðardóttir & Hjartarson, 2016). On the political platform, President G.W. Bush passed the No Child Left Behind Act (NCLB), mandating standardized tests and penalizing schools not showing improved student achievement (Chen, 2018; Kessinger, 2011; No Child Left Behind [NCLB], 2002; Michelman, 2018; Sass, 2021; Smith, 2005; Vinovskis, 2015). In 2003, the International Association for K-12 Online Learning (iNACOL), opened as a non-profit to support online schooling (Sass, 2021). In 2009, Obama's Race to the Top initiative poured $4.35 billion into educational reform in public schools due to the administration's belief in a reform strategy based on state competition for federal funding (Howell & Magazinnik, 2017; Lavenia et al., 2015; Paunesku et al., 2015; Sass, 2021). Race to the Top presented six policy categories for states to improve education with a focus on raising achievement scores, adopting Common Core standards, using data for instructional improvements, high-quality teacher training, turning around low performing schools, and enhancing charter schools (Howell & Magazinnik, 2017; Lavenia et al., 2015). In 2007 the Common Core standards were written to bring a cohesive set of learning requirements to American schools (Lavenia et al., 2015; Michelman, 2018; Sass, 2021; Spring, 2017). Quest to Learn (Q2L), an innovative game-based learning school opened in New York (Sass, 2021). Schools gained access to web browsers and search engines while innovations such as Google,

individual blogs, smartphones, tablets, and other devices became a regular part of the modern human's life (Meyer, 2018).

Technological advances have served to launch the field of education into a new level of innovation possibilities (Peterson, 2011; Tarbutton, 2018). Venture philanthropy, the backing of a good cause as a business venture, has become a new element of modern education (Templeton Academy, 2018; Williamson, 2018). Philanthropic financial support has funded an innovative reformation of education to a high-tech, small-scale models (Templeton Academy, 2018; Williamson, 2018). Examples of venture philanthropists are Laurene Powell Jobs, Sal Kahn, Mark Zuckerberg, and Steve and Melinda Gates (Koteskey, 2018; Russo, 2017). Famous persons are not educators, but affluent entrepreneurs have influence in an age of parent discontent with school systems (Cohen, 2017; Williamson, 2018; Zimmerman, 2020). Parents, students, and teachers of today should show concern with the concept of entrepreneurs, affluent philanthropists, and technology gurus deciding what curriculum should be, rather than experts trained in the field of education (Livingstone et al., 2012; Williamson, 2018). The turn of the century serves as a marker for a generation of learners, similar to predecessors, possessing a need for academic development, preparation for a vocation, knowledge about good citizenship, resilience for real life challenges, individual growth skills, and the expanded ability to be a member of the global community (Bishop & Harrison, 2021; DiBenedetto & Myers, 2016; Goral, 2018; Templeton Academy, 2018; Washington, 2021).

Goals of schooling and learning. Three and a half centuries ago, parents wanted schools to reiterate a community's religious and moral values to children (Chen, 2018; Rury, 2013; Spring, 2017). Today, parents want children to be prepared for college and eventually jobs in a tech-rich world (Batsila & Tsihouridis, 2016). The American education system maintains the

goal of creating citizens well suited to meet society's needs (Bishop & Harrison, 2021; Kessinger, 2011; Spring, 2017; Templeton Academy, 2018; Vinovskis, 2015). Workers must adapt quickly to new digital interfaces (Batsila & Tsihouridis, 2016). Indeed, technology is prevalent, even integral to the functioning of today's workplace (Meyer, 2018). While preparation for a future career involves edtech learning, the scientific field conclusively proves success in school is dependent on factors beyond intelligence and cognitive ability (Darling et al., 2020; DiBenedetto & Myers, 2016; Duckworth & Yeager, 2015; Uhls et al., 2014). Noted qualities include a set of human traits such as relational competencies, self-control, executive functioning, delayed gratification, honesty, agency, and attitude about one's abilities (Bjorklund-Young, 2016; Duckworth & Yeager, 2015; Vaughn, 2018; Williams, 2017). The Every Student Succeeds Act (ESSA) now requires states to measure the development of non-cognitive skills as part of student outcomes (Bjorklund-Young, 2016; ESSA, 2015; Tarbutton, 2018).

Personalized learning and digital integration. Administrators, teachers, and students have differing views on the purpose of individual devices used in schools (Byers et al., 2018; Evans, 2018; Selwyn et al., 2017; Storz & Hoffman, 2013). Administrators struggle to respond to top-down mandates to utilize funds granted for technology integration in individual schools (Katzman, 2012; Selwyn et al., 2017). Veteran teachers are more likely to take direction with a less serious attitude, and may find a pathway to success, even if directed by administration to embrace technology in the classroom in a particular way (Thomas & Cooper, 2016). In order to give teachers tools to be better instructors and students access to more learning resources, administrative leaders opt for either school-owned or student-owned devices (Selwyn et al., 2017). Teachers desire to integrate technology into classes in incremental ways, still allowing students to accomplish the same learner tasks, only in a different manner (Hefty, 2014; Peck et

al., 2015; Selwyn et al., 2017). Novice teachers are likely to listen to veteran teachers in implementation plans for reform, however, may feel the new approaches recently learned are more applicable to today's students, viewing the veteran ways as outdated (Thomas & Cooper, 2016).

Technology in schools today is both an intentional school reform and an unexpected catalyst for change (Cho & Littenberg-Tobias, 2016; Hefty, 2014; Peck et al., 2015). The positive reform is slow and incremental while the uninvited change is found to be disruptive and distracting, presenting challenges for classroom management and learner engagement (Cho & Littenberg-Tobias, 2016; Katzman & Horn, 2016; Peck et al., 2015; Selwyn et al., 2017). Current technological resources provide new learning platforms for personalized learning opportunities (Bi & Shi, 2019; Bingham, 2017; Buzzetto-Hollywood & Alade, 2018; Cohen, 2017; Cuban, 2017; Curry & Mania, n.d.; Hui, 2016). Personalized Learning (PL) is not a singular adoptable program. PL is a complex, flexible, and diverse set of strategies, methods, and constructs requiring intentional design to fit in a given educational structure (Cuban, 2017; DeArmond & Maas, 2018; Koteskey, 2018). Research suggests digital platforms may increase student motivation (Batsila & Tsihouridis, 2016; Zainuddin, 2018). Some studies acknowledged students performed better on digital rather than paper-pencil tests and others show a gamified platform may yield higher quiz scores (Hamad, 2017; Zainuddin, 2018). Students enjoy learning from classmates on digital posts and in chat forums (Hamad, 2017; Zainuddin, 2018). PL allows data analysis by smart ware, directing students to a particular pathway of learning (Cuban, 2017; Lee et al., 2018; Williamson, 2018). While the coding structure of an educational operating system may be applicable as a sweeping solution to targeted, personalized instruction, not all

researchers are convinced PL can deal with the messier elements of developing humans in a social context (Goral, 2018; Williamson, 2018).

Emerging Elements of Micro-Schools Model

Today's tech-integrated innovative schools represent a unique subset of educational startups, not just a modification of a current school already in motion (Williamson, 2018). Tech-driven MS reform has gained popularity and produced innovative school models due to massing funding from prominent, powerful figures such as Facebook founder Mark Zuckerberg, and XQ Super School's Laurene Powell Jobs (Cohen, 2017; Russo, 2017; Williamson, 2018). MSs address the non-cognitive elements of learning alongside targeted academic growth, which parents view as a positive element of schooling (Templeton Academy, 2018). Still new on the educational landscape, MSs vary in structure, cost, size, and student body, and have not yet emerged with an entirely consistent definitive set of distinctive qualities (Crischelle, 2020; Horn, 2016). A comparison can be made to the one-room schoolhouse of the 19th century due to the tendency of open, shared space, and a multi-aged group of learners (Artz, 2018; Crischelle, 2020; Horn, 2016). Many qualities are indicative of MS environments and include an open shared space by a student body of less than 150, a small cross-age interactive student population, a more fluid learning atmosphere, PL software for core subjects, inventive schedules, and teachers as learning coaches (Crischelle, 2020; Horn, 2016; Katzman & Horn, 2016; Templeton Academy, 2018). MSs are known for a limited student body size of multi-age grouped students experiencing project-based collaborative and personalized units, often delivered through a digitally-based curriculum (Crischelle, 2020; Cohen, 2017). The small sized community allows MS educators to focus on individualized pacing and building relationships (Crischelle, 2020; Templeton Academy, 2018).

MSs are small and personalized in comparison to traditional schools, which are often described as large and standardized (Cohen, 2017; Crischelle, 2020). The population of 150 is derived from Dunbar's number of individuals a person can know in a community (Templeton Academy, 2018). In the model, students are part of shaping educational decisions (Artz, 2018; Kapoor, 2015; Sigurðardóttir & Hjartarson, 2016; Templeton, 2018). As a community, students work in collaborative teams on projects and use portfolio platforms to demonstrate individual learning (Horn, 2016; Kapoor, 2015). Multi-age classrooms are more interdisciplinary in nature and students are clustered by ability, interest, and mastery rather than a grade level (Crischelle, 2020; Ronskley-Pavia et al., 2019).

MSs, generally privately funded by tuition monies or philanthropists, are allowed free development and implementation of new ideas without mandates placed on public school systems (Cohen, 2017; Jessen & DiMartino, 2020; Russo, 2017). Educators leading the MS movement see the benefits the MS model provides in creating a collaborative, personalized, student-centered, whole-person philosophy, and creative learning environment (Artz, 2018; Cohen, 2017; Russo, 2017; Templeton Academy, 2018). Some educators question the accessibility and equity of a small-school innovative model to all students, or if the MS is a model for the elite, whose families can support a private school option (Cohen, 2017; Jessen & DiMartino, 2020; Potterton, 2020; Rodgers, 2014).

Blended Learning. To meet individual needs, content delivery is accomplished through videos, readings, podcasts, and other individualized tasks (Horn, 2016; Zainuddin, 2018). Blended learning, a mixture of in-person and virtual learning experiences, is a self-paced and resource-rich environment available during and outside of class time (Hamad, 2017; Kapoor, 2015; Zainuddin, 2018). Blended learning is a key feature of MSs, with students spending time

online as well as in small mixed-age groups (Bi & Shi, 2019; Crischelle, 2020; Horn, 2016; Hui, 2016; Kapoor, 2015). Students engage in real-world community projects and accomplish core instruction through PL software (Horn, 2016; Kapoor, 2015). Advancements in educational technology applications quickly gather consistent assessment data on learners (Horn, 2016). Data moves the learner through academic content at an individualized pace (Bi & Shi, 2019; Hamad, 2017). When students are in a physical classroom with mixed-age peers and facilitating teachers, the learner-centered framework infuses digital access of blended learning into educational experiences (Curry & Mania, n.d.; Kassem, 2019; Kramer, 2018). Research indicates students report an overall positive experience with blended learning (Ravenscroft & Luhanga, 2018). Furthermore, studies have reported higher levels of student engagement and student achievement in programs involving blended learning models (Bi & Shi, 2019; Ravenscroft & Luhanga, 2018; Zainuddin, 2018).

Parent Choice. Parents of students attending MSs and private schools have made an intentional choice about a particular educational setting (Cohen, 2017; Katzman & Horn, 2016). A sense of individualism and choice has been a consistent value throughout the history of the United States (Friedman, 1955; Jessen & DiMartino, 2020). Freedom of choice for parents in regard to schooling was popularized in the 1950s to push for the free market to reform education (Friedman, 1955; Jessen & DiMartino, 2020). The competition provided by a free-market school system may increase the quality of educational programs overall (Prieto et al., 2018). Parent choice for schooling is available in most U.S. states including private, charter, online, home schooling, and other innovative models (Prieto et al., 2018). Supporters of privatization for educational reform claim public satisfaction should be the source of accountability, rather than government standards (Friedman, 1955; Jessen & DiMartino, 2020). Under the Obama

administration, autonomy was encouraged through the launch of many charter schools and provision for educational reformers (Jessen & DiMartino, 2020). The Trump administration further encouraged parents to select schools other than public schools by referring to the government school system as a monopoly (Jessen & DiMartino, 2020). Regardless of bi-partisan support, there exists a tension between education's role as a good for the whole of society and educational opportunities for the individual (Jessen & DiMartino, 2020; Potterton, 2020; Prieto et al., 2018; Rodgers, 2014).

Parents of means are more likely to take advantage of school choice options (Potterton, 2020; Rodgers, 2014). School choice may have limitations for parents in lower socio-economic strata or parents of children with disabilities (Cohen, 2017; Katzman & Horn, 2016; Koteskey, 2018; Potterton, 2020; Rodgers, 2014). Parents may sense a moral conflict in making a school choice other than public school, recognizing the possible participation in widening the socio-economic gap (Potterton, 2020). Nevertheless, the sense of accountability for the education of one's own children takes precedence (Potterton, 2020). Parents feel accountable for providing proper or appropriate education, especially meeting a child's personal interest (Potterton, 2020; Prieto et al., 2018). Parents choose innovative schools for a variety of reasons, including individualized pacing, the community aspect of a smaller school setting, an overall school culture, opportunity for creative expression, freedom from government mandates, or educational outings (Cohen, 2017; Crischelle, 2020; Friedman, 1955; Potterton, 2020). Dissatisfied with traditional public schools, parents opt into other school models, free of government oversight, which may be better suited to meet perceived needs (Artz, 2018; Horn, 2016; Friedman, 1955). In sum, parents select schools for three critical factors: opportunity for high academic

achievement, socio-economic culture of the student body, and distance from home to school (Prieto et al., 2018; Rodgers, 2014).

High-Quality Learning Environments

An effective learning environment is a substantial element in students' perception of a successful learning experience (Kassem, 2019; Lemley et al., 2014). Common characteristics of quality schools include mission, coherent instructional guidance, data-based informed decisions, learning-focused improvement processes, job-embedded professional development, budgets and policies aligned with mission, professional leadership development, elected board policy orientation, and strong relationships among all stakeholders (Bishop & Harrison, 2021; Darling et al., 2020; Leithwood & Azah, 2017). High-quality middle schools strive for excellence, targeting high-level learning for each student and extraordinary care where every child is known and has an advocate (Bishop & Harrison, 2021; Darling et al., 2020; Stuart et al., 2017). Today's effective schools have learner-centered environments (Bishop & Harrison, 2021; Hui, 2016; Luo et al., 2019; Quinn, 2015; Tarbutton, 2018). The supportive learning environment presents possibilities for a personalized approach to develop students toward targeting learning goals (Bishop & Harrison, 2021; Darling et al., 2020; Stuart et al., 2017). Curriculum is designed to be challenging, provide opportunity for exploration, and integrate multiple subjects (Bishop & Harrison, 2021).

According to Bronfenbrenner, the Bio-ecological Model rests on the requirement of adult educators having an impassioned commitment to love and nurture children (Brendtro, 2005; Penn, 2005). Students in high-quality environments with positive peer support, low peer-to-peer conflict, and high-closeness relationships with teachers have the highest potential for active engagement in the classroom, and consequently higher academic achievement (Darling et al.,

2020; Kim & Capella, 2016; Templeton Academy, 2018). Classroom teachers are committed to the strategic use of personalized learning to measure student achievement against a consistent set of standards (Stuart et al., 2017). Teachers able to provide a high-quality environment, and minimize student-to-teacher conflict, create an environment where students may be more successful (Kim & Capella, 2016; Lemley et al., 2014).

In high-quality learning environments, teachers and students take responsibility for learning, participate in collaborative meetings, communicate feedback promptly, provide clarity for assignments, utilize formative assessments to remediate or enrich, invest in relationships between peers and instructors, and experience varied instructional approaches (Lemley et al. 2014, Stuart et al., 2017). Teachers act as partners with students, learning alongside pupils, listening to student perspectives, and seeking to understand strengths and passions to individualize learning (Lemley et al., 2014; Stuart et al., 2017). Successful schools, for example a school in Finland, sustain a sense of urgency for constant change in a positive direction by keeping eyes fixed on the innovative companies surrounding the community (Katzman, 2012; Stuart et al., 2017). High-quality classrooms demonstrate strong emotional support, clear classroom organization, and accessible instructional support (Kim & Capella, 2016; Lemley et al., 2014). The elements of an effective classroom leading to the students' sense of autonomy include flexible learning spaces, virtual activities, self-reflection exercises, multimedia presentations, group projects, opportunity for clarifying questions, and open interactions with a teacher (Lemley et al., 2014; Montenegro, 2019). The personalized elements of the high-quality learning environment are indicative of the MS model (Koteskey, 2018; Horn, 2015; Templeton Academy, 2018).

Student Agency

Student agency is the capacity one has to control personal actions in response to constraints, structures, or conventions (Deed et al., 2014; Vaughn, 2018). Students are active agents engaged in learning processes (Williams, 2017; Vaughn, 2018). Agency has been a vague term relating to the interplay of a sense of freedom of choice, initiating involvement in the learning process, the student's self-reliance in obtaining content knowledge, and motivation for an individual in a given context (Hitlin & Elder, 2007; Montenegro, 2019; Reeve & Tseng, 2011; Vaughn, 2018; Veiga, 2016). Agency is observable in student activities such as asking questions of teachers, sharing like or dislike of learning activities and lessons with teachers, commenting on personal interests to teachers, and making suggestions for improvement of classes (Veiga, 2016; Wall et al., 2018). Increased student agency, learning inspired by personal curiosity and embedded in self-awareness, may be more effective and more desirable than teacher-driven instruction (Avery et al., 2021; Lin-Siegler, Dweck, & Cohen, 2016; Reeve & Tseng, 2011; Williams, 2017).

Student agency has the complexity of existing in a chronology of one's very immediate space as well as a sense of goal attainment in the future (Hitlin & Elder, 2007; Vaughn, 2018). Researchers recognize virtual and physical spaces have an impact on the learning process (Byers et al., 2018; Deed et al., 2014). A person's perception of the freedom to act is determined by the social construct of an environment and individual traits (Hitlin & Elder, 2007; Vaughn, 2018). Agency involves motivation, engagement, curiosity, competence, and student choice (Alrashidi et al., 2016; Vaughn, 2018; Wall et al., 2018; Williams, 2017). Motivation comprises a student's belief in the ability to succeed in intellectual pursuits within a learning environment and an

eagerness to accomplish tasks (Lin-Siegler, Ahn, et al., 2016; Oluwatayo et al., 2016; Vaughn, 2018).

In a school setting, autonomy is a teachable skill even while not an innate human trait (Kassem, 2019; Vaughn, 2018; Wall et al., 2018). Proponents of developing student agency call educators to evaluate the extent to which student feedback is referenced for change in the classroom (Reeve & Tseng, 2011; Vaughn, 2018; Williams, 2017). Schools utilizing personalized learning cannot assume a high level of student ability to work autonomously (Bingham, 2017). "Autonomy is neither automatic nor automatically good" (Bingham, 2017, p. 541). Personalized learning strategies require a complex interplay of teacher and student agency (Deed et al., 2014; Bingham, 2017). Agency involves autonomy as well as the ability to engage with peers and teachers as needed when met with a challenge (Deed et al., 2014; Vaughn, 2018; Williams, 2017).

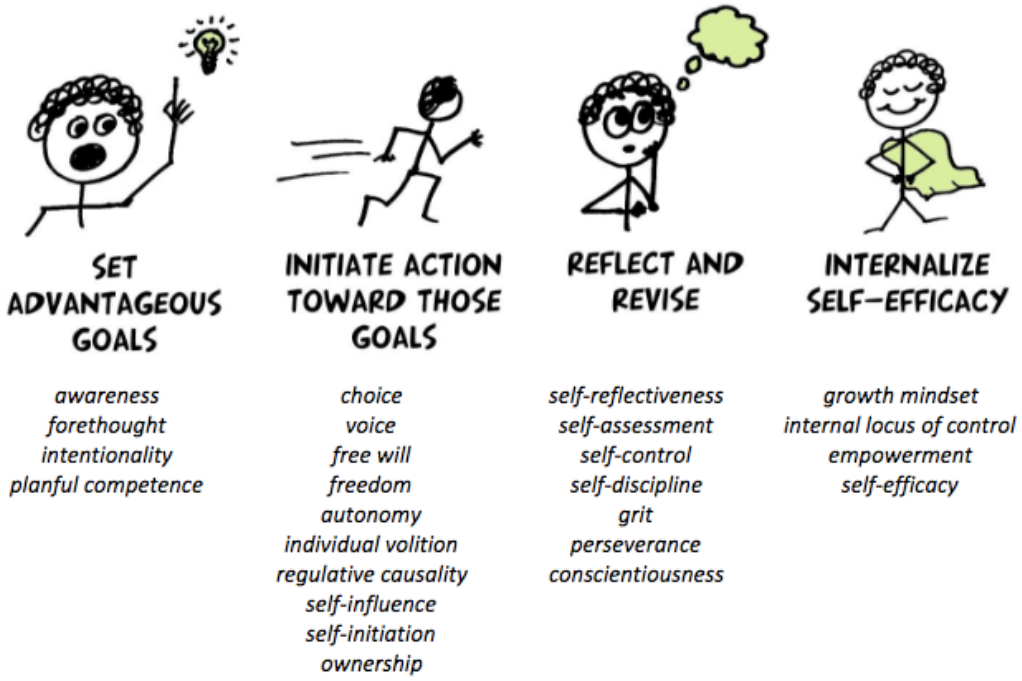
Agency has emerged in the educational conversation as a critical aspect of human development (Hitlin & Elder, 2007; Mameli et al., 2019; Reeve & Tseng, 2011). Student agency, including motivation and the power to act, is associated with student achievement (Lin-Siegler, Ahn, et al., 2016; Mameli et al., 2019; Veiga, 2016; Williams, 2017). Teachers may desire to develop student agency, however, standardized testing accountability pressures and the lack of knowledge of effective strategies for teaching agency remain barriers (Luo et al., 2019; Poon, 2018; Richardson, 2019; Vaughn, 2018; Wall et al., 2018). Student and teacher agency have a complex relationship in the open classroom (Deed et al., 2014; Kelchtermans, 2017; Vaughn, 2018). Student agency involves a sharing of learning, moving through the learning journey with elements of independent study, collaborative work, as well as interactions with the teacher (Deed et al., 2014; Vaughn, 2018). Aspects of autonomy seen as positive contributors to motivation

include flexible learning options, the accessible rationale for meaningfulness of assignments or topics, communicating choice to students, and validating negative feelings students may experience when approaching rigorous learning tasks (Jacobi, 2018; Vaughn, 2018). Students perceiving personal competence are more motivated and experience higher learning achievement, however, evidence does not currently suggest perceived competence leads to higher scores in every learning context (Jacobi, 2018; Luo et al., 2019; Vaughn, 2018).

Student agency is not an innate proficiency or personality trait; agency is developed and learned (Mameli et al., 2019; Vaughn, 2018; Wall et al., 2018). Personality traits such as extroversion versus introversion do seem to play into an individual's sense of agency (Luo et al., 2019). At the practice level, agency is a multifaceted concept and involves setting goals, having motivation to move toward goals, then identifying and overcoming hurdles to achieve the goals (Luo et al., 2019; Poon, 2018). Next, student agency involves adapting, persevering, and advocating for oneself until the goal is reached (Hitlin & Elder, 2007; Poon, 2018; Vaughn, 2018). High levels of student agency show a propensity to use knowledge from one's past, current circumstances, and a view of future outcomes (Poon, 2018). Students need to develop the skills and abilities to be independent thinkers, self-confident, and possess the resilience to overcome challenges (Vaughn, 2018; Williams, 2017). The following diagram in Figure 3 lays out four elements of student agency as described by Poon (2018). Of note is the complexity of the sense of autonomy a student embraces within the context of a school setting.

Figure 3

Four Components of Student Agency



Note: From What do you mean when you say "student agency"? by Poon, 2018, Retrieved from *(https://education-reimagined.org/what-do-you-mean-when-you-say-student-agency/)* Copyright 2018 by Education Re-imagined. Used with permission (see Appendix A).

Educators are eager to discover how a sense of autonomy and freedom to act in one's best interest contributes to higher academic achievement (Montenegro, 2019). Some 21st-century learners, e-pioneers, are able to act with autonomy and effective independent use of innovations (Peck et al., 2015). When online instructors provide effective feedback in the form of personalized communication, such as a personal phone call or Skype session, students report higher motivation (Jacobi, 2018). Teacher-led instruction cannot be dismissed as ineffective and the level of student agency adjusts within differing environments (Luo et al., 2019; Vaughn,

2018). Shifting the focus from a teacher providing information to the student seeking understanding equips learners with a strong sense of self-determination and personal ownership of cognitive development (Vaughn, 2018; Williams, 2017). Still, adults are necessary for teaching resilience, problem solving, and live social interactions as learners gain key self-advocacy skills (Zhou et al., 2017).

Motivation. Student motivation, a non-cognitive skill, is an observable aspect of student agency through behaviors indicative of engagement (Alrashidi, 2016; Guay et al., 2000; Kassem, 2019). Motivation stems from both intrinsic and extrinsic sources (Alrashidi, 2016: Gelbach et al., 2016; Guay et al., 2000; Jacobi, 2018). Students in the middle school age group may exhibit a decreased sense of motivation (Akos, 2004). Learning environment factors affect motivation, such as teacher-pupil relationships, peer relationships, rewards, meaningfulness of school projects, the level of choice in learning activities, instructor feedback, and emotional safety (Guay et al., 2000; Jacobi, 2018; Kiefer et al., 2015; Rheingold & Seaman, 2017). Students demonstrating engagement and participation, indicators of motivation, experience higher academic achievement than less engaged counterparts (Alrashidi, 2016; Currie, 2018; Gehlbach et al., 2016). Individuals' levels of intrinsic motivation transfer from one setting to another (Guay et al., 2000). Teachers can perpetuate the characteristic of motivation in students (Currie, 2018; Fernandes, 2019; Kassem, 2019). Internal motivation is driven by the joy of discovery in learning in young learners, and extrinsic motivation has greater impact as an individual matures (Ben-Eliyaho & Bernacki, 2015; Jacobi, 2018). As autonomous motivation increases, so also learning outcomes increase for individuals (Currie, 2018). A positive correlation exists between student level of competence and student motivation (Brooks & Young, 2011; Harter, 1982). Furthermore, the perception of choice increases a student's sense of motivation (Jacobi, 2018).

Choice. Choice is a non-cognitive trait related to student agency (Brooks & Young, 2011). Learners in the 21st-century context are more likely to thrive relationally in an environment offering choice (Darling et al., 2020; Hitlin & Elder, 2007; Lemley et al., 2014). Current research reveals effective educators listen to students when designing classroom experiences, promote autonomy, and aim for relevance (Jacobi, 2018; Lemley et al., 2014; Montenegro, 2019; Zainuddin, 2018). An interest-driven philosophy gives the opportunity to select learning topics, design activities, and implement personal ideas (Darling et al., 2020; Kapoor, 2015). Teachers may provide choice through increasing freedom in lessons and providing opportunities more fitting to student interests (Currie, 2018; Darling et al., 2020; Kapoor, 2015). Research indicates learners who perceive choice in academic pursuits have buy-in and are more cooperative and more self-motivated (Currie, 2018; Hitlin & Elder, 2007). Allowing choice may extend a sense of value and trust or even partnership between learner and guide (Deed et al., 2014; Hitlin, 2007). MSs tend to be student driven and individually paced (Kapoor, 2015; Koteskey, 2018; Templeton Academy, 2018). Intrinsic motivation may be increased by a sense of choice and autonomy (Brooks & Young, 2011; Jacobi, 2018; Kapoor, 2015; Richardson, 2019). The autonomy to make one's decisions about cognitive growth is a key aspect of student agency (Deed et al., 2014; Hitlin & Elder, 2007; Poon, 2018)

Competency. Students are more likely to take risks in academic rigor when a firm sense of self-competency exists (Darling et al., 2020; Vaughn, 2018). Competency is related to a sense of confidence in the social and relational environment in the school setting as well as the freedom to revise work in progress (Darling et al., 2020; Deed et al., 2014; Hitlin & Elder, 2007). Balancing the success targets, allowing freedom within discussions, and establishing clear class routines contribute to a sense of competence (Jacobi, 2018). Competency is an acquisition

of behaviors or traits stemming from a variety of intellectual, artistic, physical, motivational, or social situations in a learner's environment, leading to positive results (Bronfenbrenner & Ceci, 1994; Bronfenbrenner & Evans, 2000; Zainnuddin, 2018). Competence is related to a preference for challenge, a desire for independent mastery, curiosity, and increased success in school (Bjorklund-Young, 2016; Harter, 1982). One's perception of a personal ability to effectively work hard to accomplish a task leading to expected outcomes results in higher academic achievement (Currie, 2018; Hitlin & Elder, 2007). Competency is measured by observable behaviors and is connected to motivation (Currie, 2018; Harter, 1982; Lemley et al., 2014). Students perceiving a high level of self-competence are more motivated to engage in learning activities (Jacobi, 2018). Approaching an unknown problem with curiosity and the perspective one is capable of success, is a sign of competence (Currie, 2018; Harter, 1982). Educators can create an environment to build competence (Currie, 2018; Darling et al., 2020). Competency is built through a process of teacher and peer feedback (Russell, 2018). The maturing student develops non-cognitive traits (Bjorklund-Young, 2016; Hoeschler et al., 2018). Competency and student agency are partners in student success (Darling et al., 2020; Hitlin & Elder, 2007; Lemley et al., 2014; Russell, 2018).

Effects of Educational Technology on Human Development

The literature reveals the strength of relationships with both peers and teachers positively contributes to a student's achievement (Cohen, 2017; Kiefer et al., 2015; Kim & Capella, 2016; Lemley et al., 2014; Rucinski et al., 2018). Students are relational, intellectual, emotional, and spiritual beings (Cho & Littenberg-Tobias, 2016; Rucinski et al., 2018). Elements of the learning environment need to lead to positive social behaviors and good citizenship (Cho & Littenberg-Tobias, 2016; Templeton Academy, 2018). As such, when researching the concept of technology

in the classroom, many are concerned about possible adverse impacts on students as whole persons (Bellur et al., 2015; Cho & Littenberg-Tobias, 2016; Christakis et al., 2018; Darling et al., 2020; Livingstone et al., 2012; Meyer, 2018; Meyers, 2009). Some studies show a relationship between the amount of screen time and conveying signs of depression and even addiction in adolescents (Rue, 2018; Christakis et al., 2018). Other research describes learning settings involving a personal media device, such as a tablet, as positive assistance to social-emotional learning even at the youngest ages (Whitehead, 2017; Meyer, 2018). While overuse of digital devices may prevent engagement in social or physical activities, due to the limited hours in a day, some screen time for adolescents may actually contribute positively to development (Bishop & Harrison, 2021; Przybylski &Weinstein, 2017; Zhou et al., 2017).

Current literature is rich with research to support social-emotional relationships' impact on student learning (Eisenbach et al., 2020; Kiefer et al., 2015; Kim & Capella, 2016; Jacobi, 2018; Rucinski et al., 2018). Students report a strong need for human connection, while technology remains an integral piece of the 21st-century classroom (Eisenbach et al., 2020; Lemley et al., 2014). The literature points to the need for upper elementary teachers to be intentional about structuring strong relationships with students, as maintaining positive student-relationships is effectual to strengthen learning outcomes (Lin-Siegler, Dweck, & Cohen, 2016; Rucinski et al., 2018; Templeton Academy, 2018). Students in higher grades lean into peer-relationships with more intention than lower primary counterparts, suggesting as students age, there is a higher need for more peer-to-peer support (Kiefer et al., 2015; Kim & Capella, 2016). Student-to-student relationships play a large role in middle grade students' sense of motivation, belonging, and engagement (Eisenbach et al., 2020; Kiefer et al., 2015; Sørlie et al., 2020; Templeton Academy, 2018). Connectedness with the teacher involves respect, a sense of care,

students feeling known by the teacher, dialogue, and a teacher's openness about personal aspects of life (Lemley et al., 2014; Lin-Siegler, Dweck, and Cohen, 2016; Rucinski et al., 2018). Teachers able to communicate common traits with students have stronger relationships; seeking affinities with students is a strategy with positive outcomes (Lin-Siegler, Dweck, & Cohen, 2016). Strong teacher-child relationships are an important element of high-quality classroom emotional climate (Lin-Siegler, Dweck, & Cohen, 2016; Rucinski et al., 2018).

Some learners may benefit from the potential positive social outcomes of digital learning (Whitehead, 2017). Examples from the literature include young pairs using a single computer monitor to read and solve a problem together, students photographing a group project and writing captions for methods of working the problem, posting results online for peers to view and learn from, engaging student discussions, and virtual access to teachers outside of class time (Jacobi, 2018; Whitehead, 2017). Some research indicates student-faculty interactions are stronger in blended learning courses than traditional lecture-type courses (Ravenscroft & Luhanga, 2018). For example, when online professors provide effective feedback in the form of personalized communication, such as a personal phone call or Skype session, students report higher motivation (Jacobi, 2018). Students are successful in an environment enriched by both peer and teacher support (Kiefer et al., 2015; Rucinski et al., 2018; Templeton Academy, 2018).

Conclusion

From the days of the early Americans to the Silicon Valley tech revolutionaries, education is about training the next generation for adulthood (Horn, 2016; O'Neill, 2015; Rury, 2013). Leading through change is difficult (Bennett et al., 2008; Donsky & Witherow, 2015). Change and innovation is even more complex, calling on leaders to create a positive collaborative culture with a blend of firm guidance and allowance for experimentation (Bennett

et al., 2008; DeArmond & Maas, 2018). Many eager, creative, education reformers launch innovative structures, yet there must be an understanding of how disruptive insertions affect human development and the necessary elements of student agency (Richardson, 2019; Williams, 2017). Educators remain unclear on the impacts of emerging innovative schools on the non-cognitive elements of learning (Cho & Littenberg-Tobias, 2016; Roberts-Mahoney et al., 2016; Williamson, 2018).

Recognizing parental dissatisfaction with conventional classroom and school system constructs, entrepreneurial educators have hoped to create a learning community more closely replicating the workplace in autonomy and collaboration (Cohen, 2017; Horn, 2016; Koteskey, 2018; Williamson, 2018). MS success is dependent on student agency, the capacity of the learner to set personal goals, be self-determined, motivated, and to communicate needs and opinions effectively (Deed et al., 2014; Kapoor, 2015; Luo et al., 2019; Poon, 2018; Vaughn, 2018). Student agency has been a studied topic in education for the past 30 years (Akos, 2004, Deed et al., 2014; Hitlin & Elder, 2007; Luo et al., 2019; Mameli et al., 2019; Poon, 2018; Vaughn, 2018: Wall et al., 2018). The learner's agentic ability involves efficacy in how the individual operates within and relates to an environment (Jacobi, 2018; Mameli et al., 2019; Zainuddin, 2018). Some studies have explored student agency at the middle school level (Akos, 2004; Wall et al., 2018). Existing literature does not provide research on the extent to which the three elements of student agency exist or are nurtured in the 21st-century innovative school, the contemporary MS. Yet, the Bio-ecological Model legitimizes the need to look at the environmental effects of a new schooling model on student development (Ben-Eliyaho & Bernacki, 2015; Bronfenbrenner, 1977; Templeton Academy, 2018).

Elements of the MSs, such as PL, blended learning, digital device usage, collaboration, and student-centered learning environments, have been the topics of multiple studies (Artz, 2018; Bingham, 2017; Cohen, 2017; DeArmond & Maas, 2018; Eisenbach et al., 2020; Kapoor, 2015; Koteskey, 2018; Miller et al., 2014; Oluwatayo et al., 2016; Roberts-Mahoney et al., 2016). First, the existing studies of innovative models tend to focus on the teacher or school leader perspectives (Donsky & Witherow, 2015; Kelchtermans, 2017; MacMath et al., 2017). Where student perspectives are ascertained in the literature, the concentration is on undergraduates or high school (Deed et al., 2014; Eisenbach et al., 2020; Kim & Capella, 2016; Lemley et al., 2014; Luo et al., 2019; Oluwatayo et al., 2016; Oriol et al., 2017; Peck et al., 2015). Some studies are beginning to scratch the surface on the student perspective, such as Project Tomorrow's focused survey on technology use in the classroom, and a New York City study on classroom level relationships (Evans, 2018; Rucinski et al., 2018). Some small case studies also exist, concentrated on observing the structure or the start-up element of the MS model (Darling & Gelernter, 2017; Kapoor, 2015). Recent studies considered PL, innovative designs, and non-cognitive skills in traditional school classrooms (Bi & Shi, 2019; Byers et al., 2018; Evans, 2018; Rucinski et al., 2018). Particular to MSs, a gap in literature exists in understanding the learner perspective on a perceived sense of agency and how one's sensibilities contribute to individual learning in relation to understanding of student motivation, choice, and competency (Russell, 2018).

The learners of 21st-century schools present a unique set of propensities (Rue, 2018; Schwieger & Ladwig, 2018; Southgate, 2017). Cast into a tech-centric world, today's teachers and learners must embrace innovative platforms (Eisenbach et al., 2020; Selwyn et al., 2017). There may exist a temptation to over-innovate and disregard a sense of stability in the learning

structure (Stuart et al., 2017). The literature calls for more research on effective technology usage for today's learners, recognizing a need for tech skills in future jobs and acknowledging the impact of the school on student development (Bellur et al., 2015; Bronfenbrenner, 1977; Eisenbach et al., 2020; Rue, 2018; Stuart et al., 2017; Templeton Academy, 2018). School systems which give choice and responsibility to students provide preparation not only for success in maneuvering a school's learning program but facilitate better decision-making when selecting a career as a young adult (Mameli et al., 2019; Templeton Academy, 2018). The potential presented by rapid information and computer technology advancements makes exploring ed-tech impact invaluable (Miller et al., 2014). Past researchers suggest the field of educational research to continue to study innovative models and the longevity and impact on education as a whole (Sigurðardóttir & Hjartarson, 2016). Studying the effectiveness of certain models helps schools find a balance between striking out on adventurous changes and having a disciplined focus on incremental development (Bennett et al., 2008; Katzman & Horn, 2016; Stuart et al., 2017).

The study of the impacts of technology on human development is expected to be a long-term endeavor (Bronfenbrenner & Evans, 2000; Meyer, 2018). Schools must consider how to make device usage more meaningful for students and how school authorities can frame protocols and rules for teachers and students leading to thriving learners (Selwyn et al., 2017; Zhou, 2017). Generally, schools must keep an open mind to educational transformation with the continuous connectivity to the outside world one-to-one devices provide, all within the context of the reality of human development (Bronfenbrenner & Evans, 2000; Selwyn et al., 2017).

Chapter III

Design and Methodology

Introduction

The purpose of this study is to examine the impact of the unique MS environment on the development of student agency in regard to motivation, choice, and competency for middle grade students (Mameli et al., 2019; O'Neill, 2015; Oluwatayo et al., 2016; Wolff et al., 2020; Wall et al., 2018). The interjection of information and computer technologies (ICT) in the modern educational landscape, combined with a call for innovative reform from parents, policymakers, and businesses to endow the 21st-century learner with technological agility, is met with a burgeoning group of philanthropists, software designers, and entrepreneurs (Bingham, 2017; Cohen, 2017; Koteskey, 2018; Lee et al., 2018; Livingstone et al., 2012; Miller et al., 2014; Rodriguez-Gomez et al., 2018). An already tenuous age, middle grade students' perspectives on learning environments enriched with ICT assist educational researchers in determining efficacy of particular models (Evans, 2018; Kiefer et al., 2015; Meyers, 2009). Gaining perspectives of individuals experiencing a phenomenon through surveys, preteens and early adolescents, enables researchers to understand a holistic view of the impacts of the learning environment (Creswell & Guetterman, 2019; Evans, 2018; Fernandes, 2019).

MSs are new as educational venues (Horn, 2016; Koteskey, 2018). As a model, innovative start-up MSs, serving students in cross-age groups, remain only anecdotally studied (Curry & Mania, n.d; Horn, 2016; Prothero, 2016; Kramer, 2018). While no detailed list of qualities present MSs as a well-defined model, commonalities include a small student body, an open-concept learning space, embedded PL platforms for individualized learning, and the philosophical premise of a learner-centered pedagogical approach (Cohen, 2017; Curry & Mania,

n.d.; Horn, 2016; Prothero, 2016; Koteskey, 2018). Educators answer a moral mandate to create a learning environment to best prepare learners for a successful future (Wertsch, 2005).

The literature on MSs is scarce, yet there exists a body of evidence to support the continued study of the student agentic elements of motivation, choice, and competency (Reeve & Tseng, 2011; Vaughn, 2018). Motivation has proven to be a key factor in student achievement (Alrashidi et al., 2016; Currie, 2018; Reeve & Tseng, 2011; Zainuddin, 2018). Likewise, existing literature recognizes the autonomy of choice as an element of student success (Bingham, 2017; Currie, 2018; Jacobi, 2018). Furthermore, a link occurs between a student's perceived sense of competency with the tools in a learning environment and individual academic performance (Bjorklund-Young, 2016; Currie, 2018; Jacobi, 2018). A modern edtech stage, set with rapidly enhancing innovations, calls educational researchers to launch forward into uncharted territory on behalf of 21st-century learners (Bennett et al., 2008; Lee et al., 2018; Rodriguez-Gomez et al., 2018; Storz & Hoffman, 2013).

As a non-cognitive element of learning, student agency requires more study (Bjorklund-Young, 2016; Mameli et al., 2019; Montenegro, 2019; Vaughn, 2018). Student agency, one's perceived power and autonomy to act on one's own in a given environment, is common to the learner-centered approach and has a multi-dimensional quality (Luo et al., 2019; Poon, 2018; Vaughn, 2018). The research design intentionally locates the study to occur within the child's daily learning space, the school, recognized as an element of the microsystem, an influential element of middle grade students' development (Bronfenbrenner, 1977, 1979; O'Neill, 2015; Wolff et al., 2020). Researchers use a range of methodologies to gather and analyze data relating to problems or phenomena in the field of education (Cohen et al., 2007; Maxwell, 2013).

Chapter III describes the processes, constructs, and methodologies utilized to explore the designated qualities of student agency for middle grade students in the MS environment addressed within the research project. Mixed methods research designs must provide commentary on the benefits of and reasons for using the methodology (Creamer, 2018). The chapter outlines the mixed-methods elements and details of the quantitative survey followed by the qualitative semi-structured focus groups of an explanatory sequential design (Creswell, 2012; Mertler, 2016; Onwuegbuzie & Collins, 2007). Additionally, the study involves a twofold comparative analysis wherein the data from both the student surveys and the focus groups is evaluated (Maxwell, 2013). Descriptions of student participants are provided, for both elements of the mixed-methods study, as well as data collection procedures for the quantitative and qualitative steps.

Research Questions

The following research questions served as both a guide and a focusing tool (Maxwell, 2013).

1. How does the micro-school learning environment impact a middle grade student's perception of student agency in regard to a sense of motivation?
2. How does the micro-school learning environment impact a middle grade student's perception of student agency in regard to a sense of choice?
3. In what ways does the micro-school learning environment's use of a personalized learning platform impact student agency in regard to a middle grade student's sense of competency?

Research Design

Proper educational research is systematic and methodical (Creswell, 2012; Marshall & Rossman, 2016; Mertler, 2016). A common mixed-methods design, explanatory sequential design, was employed to examine middle grade student perceptions of student agency within a given school environment (Creswell & Creswell, 2018; Creswell & Guetterman, 2019; Onwuegbuzie & Collins, 2007). Mixed-methods approaches mix types of inquiry to obtain a deeper understanding of a phenomenon (Creswell, 2012). Mixed-methods design combines more than one type of data (Mertler, 2016). In the current study, the initial quantitative step utilized a Likert-scaled student survey (Mertler, 2016). The secondary phase involved a series of four semi-structured focus groups (Onwuegbuzie & Collins, 2007). A complex design incorporating comparisons of two groups and an ordered quantitative and qualitative design must be carefully planned to avoid becoming unwieldy (Maxwell, 2013; Murawska & Walker, 2017).

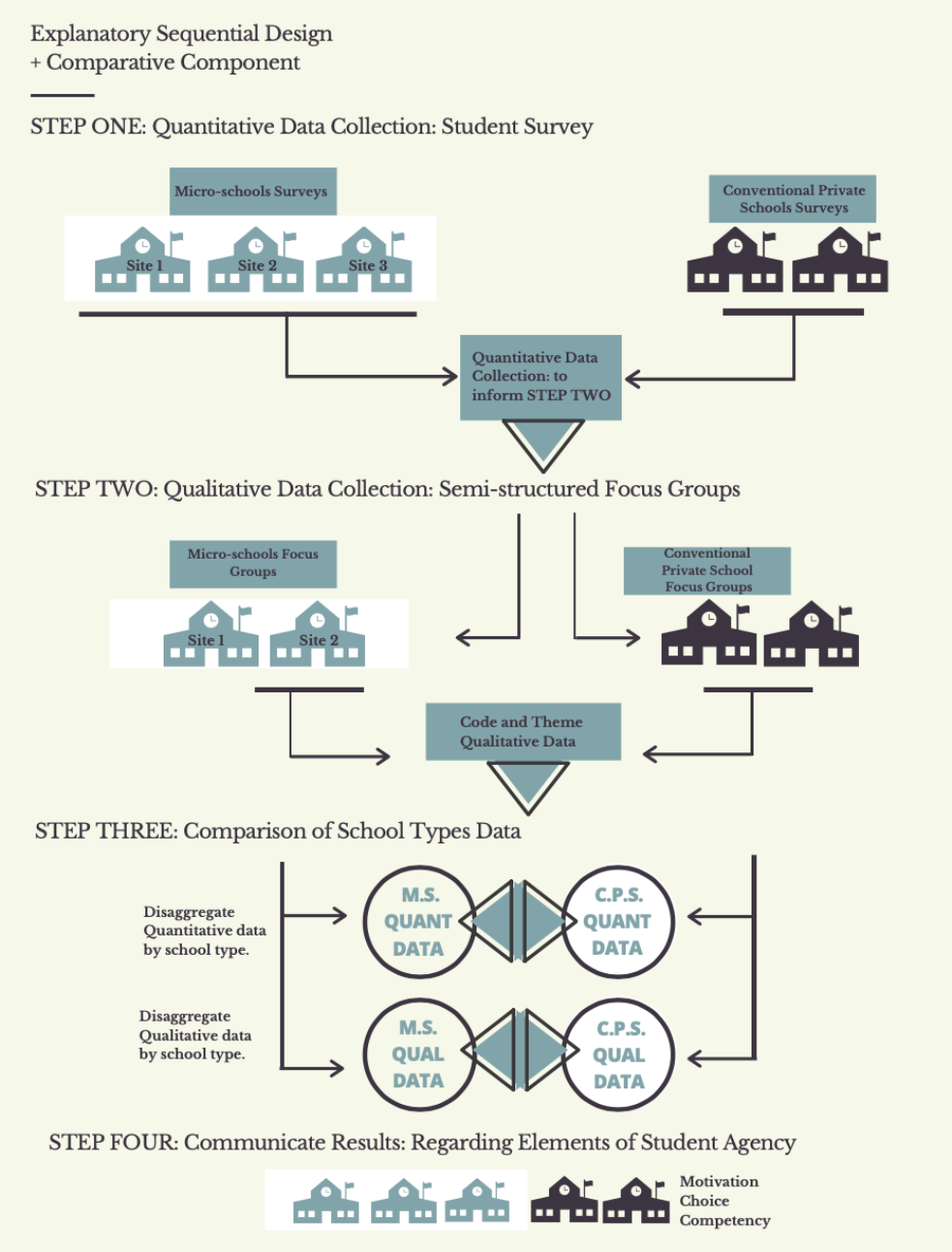
The researcher collected quantitative and qualitative data in a fixed step-by-step manner (Creswell & Guetterman, 2019; Mertler, 2016; Onwuegbuzie & Collins, 2007). The explanatory sequential design structure collects and assesses quantitative data, utilizing the data to determine the direction of the qualitative portion (Ackley, 2019; Bowen et al., 2017; Creswell & Guetterman, 2019). Incorporating an explanatory sequential research design across two parallel school models, the study integrates a comparison of both quantitative and qualitative measures (Bowen et al., 2017; Creswell, 2012; Onwuegbuzie & Collins, 2007). The comparative mixed-methods study involved a twofold comparison framework (Creswell, 2012; Creswell & Guetterman, 2019; Maxwell, 2013). The study captured the perception of participants on the extent to which three subcategories of student agency, motivation, choice, and competency, are effectual in modern MS classrooms (Creswell, 2012; Creswell & Guetterman, 2019; Maxwell,

2013). Figure 4 provides a diagram of the research design incorporating the mixed-methods data collection processes as well as the comparison of the quantitative and qualitative data from both the MS and CPS groups.

In educational research, the term comparative requires clarification (Creswell & Guetterman, 2019). Comparative studies begin with detailed data from two or more sources to search for similarities and differences between contributing data points and draw inferences to make application to a broader level (Creswell & Guetterman, 2019; Maxwell, 2013). As is acceptable in mixed-methods studies, the comparison occurs after the quantitative step and again after the qualitative step (Creswell & Guetterman, 2019; Onwuegbuzie & Collins, 2007). In the comparison, middle grade students in a traditional school serve as a control group (Maxwell, 2013; Mertler, 2016). While control groups are generally used in experimental design, the current study is non-experimental, and the school climate is being examined ex post facto (Hoy & Adams, 2016). The MS and CPS environments existed before the research took place (Hoy & Adams, 2016). The participants from the traditional school represent a baseline group in the study, experiencing a CPS environment, rather than the innovative MS environment (Creswell & Guetterman, 2019).

Figure 4

Comparative Explanatory Sequential Design for Two School Types



Note: Adapted from Creswell & Guetterman (2019). *Explanatory Sequential Design* combined with structural concepts from *Visual Tools for Eliciting Connections and Cohesiveness In Mixed Methods Research,* by Murawska & Walker (2017).

Two private school environments are juxtaposed in this comparative study (Creswell & Creswell, 2018; Maxwell, 2013). Parents take advantage of school choice for reasons including social climate, personalization, aligned value systems, unique field trip or creative opportunities, and freedom from government control (Cohen, 2017; Crischelle, 2020; Friedman, 1955; Potterton, 2020). Parents selecting a private education, whether an innovative MS or a CPS, tend to be in a higher socio-economic status, are dissatisfied with the public school system, and select a model perceived as more appropriate for desired educational outcomes (Artz, 2018; Friedman, 1955; Horn, 2016; Potterton, 2020; Rodgers, 2014).). Bronfenbrenner's Bio-ecological model place both the school and the home at the microsystem level of influence in human development (Brendtro, 2006; Bronfenbrenner, 1977, 1979; Onwuegbuzie et al., 2013). As an initial examination of the impact of the MS environment in educational research, the comparison of relatively homogenous groups may minimize variation in other elements of the participants' microsystems (Onwuegbuzie & Collins, 2007).

Having a framework to assess the interconnectivity assists the researcher to gain meaningful results (Creamer, 2018; Maxwell, 2013; Ravitch & Riggan, 2017). The mixed-methods design allows the researcher to explain initial quantitative results and enhance the study to include perceptions of individuals involved in MSs as students (Creswell, 2012; Maxwell, 2013; Mertler, 2016). Validated student surveys are shown as a reliable data collection tool in educational research (Kiefer et al., 2015; Kim & Capella, 2016; MacMath et al., 2017; Ravenscroft & Luhanga, 2018). For this study, the administration of a student survey serves as the quantitative step to gather data (Ben-Eliyaho & Bernacki, 2015; MacMath, 2017; Mertler, 2016). Similar to prior educational research studies, a set of student semi-structured focus groups are used to discover student perspectives on school experiences (Cohen et al., 2007; Ackley,

2019; Hands, 2014). The mixed-methods design assisted the researcher in obtaining middle grade students' perceptions of the level of agency as seen through motivation, choice, and competency with PL platforms, in the unique MS structure.

Microsystem environment. Bronfenbrenner's Bio-ecological Model rests on the premise individuals are influenced in many modalities in the microsystem, including the school environment (Bronfenbrenner, 1979; Onwuegbuzie et al., 2013). The study occurred in the participants' actual learning environment, as Bronfenbrenner (1977) presents in the Bio-ecological Model, the interactive elements in the immediate context of a child's environment have an explicit impact on individual development. Two types of settings were incorporated to align with the theoretical framework. Differing classroom settings have an impact on student experiences (Uhls et al., 2014; Wertsch, 2005; Williams, 2017). The microsystem theoretical element was indicated in the literature as an appropriate backdrop for school-based studies (Ben-Eliyaho & Bernacki, 2015; DiBenedetto & Myers, 2016; Onwuegbuzie et al., 2013). Bronfenbrenner's Bio-ecological Model provides an explanation of proximal processes to include the interaction between the child and the immediate environment (Bronfenbrenner & Ceci, 1994; DiBenedetto & Myers, 2016; Sørlie et al., 2020). Situated in an active classroom, the setting provided the opportunity for the collection of both qualitative and quantitative data. Therefore, a mixed-methods design was appropriate to understand elements of student agency in the direct learning environment (Creswell & Guetterman, 2019).

Participants

Educational research projects involving participants must consider sample size, factors indicative of sample members, accessibility to the sample group, and the appropriate sampling strategy (Cohen et al., 2017; Mertler, 2016).

Middle grade students. Middle grade students are more likely to thrive in a supportive environment (Bishop & Harrison, 2021; Kiefer et al., 2015). This study focused on middle grade students due to a heightened sense of vulnerability of the age group (Harter, 1982; Kiefer et al., 2015; Kim et al., 2014). Existing research recognizes researchers may utilize a multi-dimensional mixed method approach to better understand motivation for middle grade students (Currie, 2018; Kiefer et al., 2015). Middle grade students in the two types of school settings were surveyed and interviewed on three specific qualities of student agency: motivation, choice, and competency (Brooks & Young, 2011; Harter, 1982; Lee et al., 2018; Lemley et al., 2014; Lin-Siegler, Ahn, et al., 2016; Vaughn, 2018). Current middle grade learners, members of Generations Z and Alpha, are capable preteens, tech savvy, and adaptable (McCrindle, 2020; Schroth, 2019). As 21st-century learners, educators are aware of a necessary set of skills imminently demanded by workplace leaders in a tech-saturated society (Bishop & Harrison, 2021; Schroth, 2019). Ensuring the sample has engaged in the experience being measured is an aspect of selecting participants (Marshall & Rossman, 2016). Therefore, understanding the impacts of an innovative model, such as the MS, on middle school students was appropriate for the study.

School site consent. Appropriate site selection is an integral part of the research design (Maxwell, 2013). The site selection process involved an internet search, website exploration, telephone calls, video-conference meetings, and email exchanges. Through the search process, the researcher located several MSs in the United States via Google searches. Reading through the school websites revealed details as to how well each school fit the particular MS model characteristics needed for the study. After determining multiple appropriate locations, administrators were contacted via email and phone calls. Initial conversations verified the

contacted MSs met the requirements for site selection, including integration of digitally delivered personalized learning, a 150 or less enrolled population, mixed-age learning groups, and a student-centered philosophy (Artz, 2018). Based on the conversations, the researcher determined to use three sites meeting the qualifications, and with administrators willing to participate in the study.

Micro-school participants. The participating MS sites were located in three separate states in the Midwestern and Western region of the United States. The first MS, Micro-school 1 (MS1), was founded in 2014. MS1 was located in an urban area and enrolls up to 50 students in grades K-12 annually. Similar to other participating micro-schools, MS1 had adopted a student-centered philosophy. Students learned in mixed-grade groupings where teachers were called guides in order to accentuate the role of facilitator rather than instructor.

Micro-school 2 (MS2) opened in 2016 and was located in a large urban environment. While the indoor space was calming, aesthetically pleasing, open, and allowed for exploration, the exterior environment consisted of city streets. MS2 allowed for mixed-age groups of learners and autonomy to lead the philosophy and pedagogy of the school. MS2 school enrolls approximately 90 students elementary through middle school each year.

Micro-school 3 (MS3) opened in 2004 and had an atypical format. The school population was limited to 100 students and served grades 6 – 12. The loose schedule allowed students to be outdoors for much of the instruction. The school was located in a region known for the surrounding rugged landscape. Excursions by whole classes was the norm. Students were in mixed-age groups and completed core academics, English Language Arts and Mathematics, utilizing personalized learning platforms on a daily basis.

Conventional Private School Participants. As a comparative, the researcher sought a sample of CPS classrooms of middle grade students, explicitly aiming for non-micro-school traits, in order to examine how differences in the learning environments may impact elements of student agency, specifically a student's sense of motivation, competence, and choice. Two private faith-based schools participated in the study. The schools were structured using conventional individual grade levels. Students progressed through curriculum based on grade-level published curriculum and age level. The students were also middle grade students, members of Gen Z and the Alpha Generation. Therefore, the participants had access to digital devices in the classroom and the ability to use edtech for limited, teacher-directed, learning activities. The schools both functioned under a teacher-centered philosophy, in which the certificated adult held the majority of decision-making power in each classroom, limiting a student's choice in lesson activities.

Conventional private school 1 (CPS1) was located in the Western region of the United States. The school had a smaller population of students of approximately 50, and was located in an open, suburban area outside a small city. The philosophy of the school was teacher-centered, with a clear focus on shaping character as well as academics in learners. The campus was surrounded by agricultural lands and less compact residential areas than CPS2. Classrooms at CPS2 were set up by traditional grade levels and followed a bell schedule. Students in middle grades had access to edtech to engage in teacher-directed learning activities. Middle school students intermingled with students in a similar age group in classes and at scheduled breaks.

Conventional private school 2 (CPS2) was located in the Silicon Valley near three major Bay Area cities. The campus was set amidst other businesses and near compact neighborhoods. On campus, CPS2 students were divided into separate classrooms by grade level and would

interact with other grade levels near the same age at lunchtime and breaks. The school had approximately 200 students in the middle grades and enrolled over 700 students in grades K – 12. Middle school students followed a multiple classroom bell schedule arranged by subject area. Students would flow from classroom to classroom in an orderly, scheduled manner to focus on one subject at a time.

Participating school demographics. Demographic information for participating schools was captured via email conversation with an administrator of the school to determine similarity of the innovative school samples and CPS samples. The homogeneity of the groups is intended to increase the validity of the study (Creswell & Guetterman, 2019). Private schools were selected as the conventional school representatives, in order to account or closely replicate represented demographics of people electing innovative or private school models, both in suburban and urban settings. Private school families, along with MS families, practice school choice rather than attending an assigned public school (Cohen, 2017; Jessen & DiMartino, 2020). The school populations represented a balance of male and female participants and non-homogeneous ethnicity. Four out of five schools were able to provide information on socio-economic status, indicating a percentage of students were eligible for scholarships. Table 1 presents overall demographics of participating schools.

Table 1

Demographics of Student Participants

Demographic	MS1 URBAN	MS2 URBAN	MS3 SUBRB	CPS1 SUBRB	CPS2 URBAN
Student enrollment	36	98	89	51	729
Gender %					
Female	53	45	46	57	53
Male	47	52	40	43	47
Genderqueer	0	1	3	0	0
Student Ethnicity %					
White	58	89	60	84	19.5
Hispanic	3	0	9	8	19
Black/African American	3	1	5	6	12
Asian	11	6	12	0	18
Native American	0	1	0	0	1
Pacific Islander	0	0	0	2	3
Other (Multiple Races & Unclassified)	25	3	3	0	27.5
Parent Socio-Economic Status					
Family income < $25000 per year	--	--	0	4	--
Family income < $75000 per year	--	--	33	25	--
Family income > $75000 per year	--	--	77	71	--
% Student qualified for needs-based tuition aid:	19	--	52	30	31

Note: Names of schools were coded as MS for Micro-schools and CPS for Conventional Private Schools to keep the identity of schools confidential and protect anonymity of minor participants.

Participant consent forms. Minors must have consent from parents or legal guardians to participate in research (Creswell & Guetterman, 2019). The researcher provided IRB and dissertation committee approved parent/guardian Informed Consent forms (see Appendix B),

including letters containing a description of the study to school personnel for distribution to parents of prospective participating students at each site (see Appendix C). The researcher worked in tandem with school site administrators, teachers, and staff via electronic communication, through electronic newsletters, and other school-specific strands of communication to distribute links for the collection of digitally signed letters of consent for each child, indicating parent permission. Consent forms were available for parents in an electronic platform via Qualtrics™ (Qualtrics, 2021). Forms included information about participation in both the quantitative survey and the possible involvement in qualitative focus groups to follow. Parents and/or legal guardians provided an electronic signature for each participating student to the Qualtrics™ platform (2021). Copies of the letters were held by the researcher and a list of qualifying participants was provided to school site administrators via email. Participation in the study was voluntary, with no coercion or incentives to participate. School administration forwarded emails, calendar invites, and access to electronic survey and video-conference links for all participating students.

School administrators, teachers, or other staff helping with the details of the study received a coffee/beverage gift card as a token of appreciation for the help. All aspects of participation were voluntary. Some students opted out of the study altogether. Each child's parents signed the letter of Informed Consent (see Appendix B) and each child, being under the age of 18, had to provide assent in the form of responding to a question on the actual opening of the survey.

Quantitative participants. In this comparative study, the participant findings from the quantitative surveys from two both MSs and CPS settings were juxtaposed. Random sampling practices are common in order to gain a well-rounded understanding of a population's viewpoint

(Creswell & Guetterman, 2019; Onwuegbuzie & Collins, 2007). Specifically, the survey participants in this study were determined through critical case random sampling (Onwuegbuzie & Collins, 2007). Critical case random sampling involves a process of selecting random participants based on a particular predetermined condition, allowing the researcher to learn about a specific environment (Onwuegbuzie & Collins, 2007). The researcher carefully selected participating school sites based on a set of criteria defining the learning environment (see Appendix G). Once school sites had been selected, the students attending the schools represented a random sample of MS and CPS populations, having no distinguishing qualities other than having a family electing to send the student to an MS or CPS. All students in the middle grades attending the target schools were invited to participate. Students, having received parent/guardian consent and given personal assent, participated. Five school sites were represented. The student participants represented two types of schools. Three MSs and two CPSs aligned to establish study site criterion. Upon gaining parent informed consent, students were permitted to participate in the survey portion of the study.

Quantitative participants were in the middle grades as defined by ages and conventional grade levels. Specifically, students were ages 8 – 14, and grades 4 – 8, as identified by particular school models. School sites each provided 15 – 200 possible student participants. Lead administrators at each site gave express permission to the researcher to complete the survey with the qualified student pool. A CPS classroom setting was involved to represent a typical sense of student agency amongst a student group outside of the MS environment. The study included a total of 119 student participants. Three MSs provided 75 students in the middle grades, 4 – 8. Two CPS provided a combined sample of 44 middle grade participants.

A letter describing the study was provided to all parents/guardians at the targeted school

sites (see Appendix C). The letter included a description of both the survey and focus groups. The letter explained parental consent as well as student assent as a requirement for student participation. The researcher's contact information was included on the letter, along with an invitation to reach out with any questions or clarifications. The researcher collected parent informed consent forms via the Qualtrics™ an online data collection application (Qualtrics, 2021).

Once parent/guardian consent was provided, the researcher scheduled a date to conduct the survey portion of the study with each school's administration. On the day of the study, the survey was presented to individual groups of student participants. The instructions for taking the survey were provided on a video, which the facilitating teacher showed to students. A secondary option of a script, identical to the video, was given to account for any technological glitches or meet other school needs. The first step on the electronic survey was a requirement for participants to give assent or to mark "no" to withdraw from the study. Before asking students to complete the electronic survey, the students read an assent script (see Appendix D). Students were clearly informed no personal negative ramifications would occur for stopping participation at any time during the study.

The three samples from MSs included students from the Midwestern and Western regions of the United States. Two conventional private faith-based schools, located in the Western region of the United States, permitted the researcher to complete the study with middle grade students in traditional classroom settings. Schools were not in the same city to allow some geographical space and aid the comparison of the two school environments as a legitimate appraisal of differing MSs, regardless of the impact of the immediate surrounding city. Table 2 demonstrates the number of participants per site.

Some parents/guardians or students of the targeted MS and CPS opted out of the study altogether. Students unable to attend school on the date of the survey due to illness or other family absence were excluded from participation. As a first step in the research design, students without a signed informed consent form for the quantitative survey were disallowed from participation (Creswell & Guetterman, 2019). Likewise, the initial instructions on the survey included an opportunity for participants to stop the activity at any time. Some students did not give assent after opening the digital survey and elected to leave the survey incomplete.

Qualitative participants. Purposeful sampling is an appropriate method for electing participants for focus group sessions to ensure a range of voices (Maxwell, 2013). In the second phase of the study, the researcher determined participants through purposeful sampling for qualitative semi-structured focus groups (Maxwell, 2013; Mertler, 2016; Robinson, 2014). To replicate other educational research studies, small groups of participants from the initial quantitative element were selected for follow-up focus group discussions (Hands, 2014; Lemley et al., 2014; Storz & Hoffman, 2013). As a requirement for participation, focus group students had contributed to the initial quantitative step in data collection.

Students were given the option to volunteer as a participant in follow-up focus groups at the conclusion of the initial online survey. The final survey item was a query asking if students would like to participate in a small group discussion with the researcher. School site administration, teachers, and staff were also instrumental in identifying a diverse student group of interviewees for the semi-structured focus groups. Help from school personnel ensured accurate representation of the heterogeneous learning community in the cohort of focus-group participants (Creswell & Creswell, 2018). The researcher requested school site administrative assistance in identifying a student representative group including varied ages, as well as diversity

in gender and ethnicity. The purposeful sampling method of selecting focus group candidates was used to ensure a variety of voices from the original sample were represented (Maxwell, 2013). The sessions included 4 - 5 prior survey participants from two MSs and two CPS, for an overall participant population of 19 students (Creswell & Guetterman, 2019).

Qualitative studies are more in depth and do not require a large number of participants (Marshall & Rossman, 2016). The semi-structured focus group portion of the study involved hearing explanations and descriptions from participants to gain more insight into the student perspectives of agency pertaining to motivation, competency, and choice (Mertler, 2016). The purposeful sampling method excluded certain qualified students from being included in the focus group portion of the study. Focus groups tend to be small, engaging four to six participants (Creswell & Guetterman, 2019). Table 2 presents the sample size of 19 participants from four of the school sites. Mixed methods educational research standards indicate embedded samples require greater than 3 participants per sub-group (Onwuegbuzie & Collins, 2007). The focus groups in the study included 4 – 5 participants per site. Each school site administrator assisted in selecting a diversity of gender, ethnicity, and grade level.

Table 2

Qualitative Participants Per School Type

School Type	Gender		Grades		Non-White Ethnicity
Micro-School					
	Female	5	Fourth	2	4
	Male	3	Fifth	0	
	Genderqueer	1	Sixth	2	
			Seventh	2	
			Eighth	3	
Conventional Private School					
	Female	6	Fifth	3	4
	Male	4	Sixth	4	
			Seventh	3	
	Total	19	Total	19	

Data Collection

Following Bronfenbrenner's Bio-ecological Model of the interconnected layers of the child's life, the study took place in the learners' natural environment, the microsystem (Ben-Eliyaho & Bernacki, 2015; Brendtro, 2006; Bronfenbrenner, 1977, 1979). The study was embedded in the familiar school building or learning station and involved the interactive elements of the environment, including teacher, peers, and particular modes of instruction. The data collection for participants occurred in a prescribed chronology, typical to explanatory sequential design, to allow the researcher to utilize quantitative data from step one to form the details of the qualitative questioning protocol in step two (Bowen et al., 2017; Creswell & Guetterman, 2019). Surveys and direct interactions between students and researchers have been

used successfully in educational research to study classroom settings (Ben-Eliyaho & Bernacki, 2015; Latsch, 2018; Lin-Siegler, Ahn, et al., 2016; Oriol et al., 2017). Administrators at each school site assisted the researcher in securing a meeting space located in students' familiar learning area. Data collected for research must maintain confidentiality for all parties included (Creswell & Guetterman, 2019). Both quantitative survey data and qualitative focus group transcripts were collected and stored in a secure manner. The data was coded to student identities and separated from the list with true names to ensure student anonymity (Marshall & Rossman, 2016; Saldana, 2016). The master list of participants was stored in a password secured digital file. Printed materials for coding and analysis were stored in a secured closet, locked with a key and inside a locked office at the work site of the researcher. All digital files were stored in password accessible cloud-based document storage as well as downloaded on a password protected computer hard drive.

Quantitative survey. Student surveys and quantitative instruments have been shown to give an accurate picture of student perspectives (Hamad, 2017; Kiefer et al., 2015; Kim & Capella, 2016; Latsch, 2018; Lemley et al., 2014; Lin-Siegler, Ahn, et al., 2016). To follow the explanatory sequential design, the first element of the study, the quantitative survey, was given as a precursor to the student focus groups (Ackley, 2019; Creswell & Guetterman, 2019; Wong & Cooper, 2016). The Combined SIMS/PLS survey was constructed as a first step in this mixed methods study as the research sought to understand the overall perceptions of the sample of students in the innovative MS and more traditional CPS sites (Creswell & Guetterman, 2019). The survey collected data for the initial quantitative section of the mixed-methods design.

The 39-item Combined SIMS/PLS included introductory instructions, a place for students to indicate assent to participate, three sub-scales of Likert-based items related to each targeted

element of student agency, closing demographic questions, and a final invitation to volunteer to join a follow-up focus group and include a name. The instrument included 32 items describing three targeted areas of a student's sense of agency. The key elements addressed in this study, motivation, choice, and competency, were explored individually through carefully selected prompts. Each item required a response with typical Likert-scaled items. Ratings include 1-Strongly Agree, 2-Somewhat Agree, 3-Neither Agree nor Disagree, 4-Somewhat Disagree, and 5-Strongly Disagree. The survey was designed from two main existing validated tools, the Situational Motivational Scale (SIMS) and the Personalized Learning Student Survey (Brooks & Young, 2011; Currie, 2018; Guay et al., 2000). The SIMS tool contributed six items and has been used in prior research to extrapolate the nuances of student motivation (Brooks & Young, 2011). The RAND Corporation published and dispersed the Personalized Learning Student Survey tool with funding from the Bill & Melinda Gates foundation (Pane et al., 2015). The tool presents multiple sets of prompts called scales (Pane et al., 2015). The study included 26 prompts from the following scales on the Personalized Learning Student Survey: Grit, Enjoyment of Learning, Student Choice, Student Engagement, Mastery Orientation, Mastery Learning, Efficacy, and Study Habits (Pane et al., 2015). Each scale was targeted to meet one of the aspects of the research questions. The survey was entitled the Combined SIMS/PLS for reference in the context of the study.

Surveys commonly include demographic questions to assist researchers in understanding the participant population (Creswell & Guetterman, 2019; Kiefer et al., 2015; Kormos, 2018; Luo et al., 2019). The initial 11 prompts captured middle grade student perceptions of motivation. The next 7 items addressed student perceptions of choice. The third set of items included 14 prompts to solicit information regarding middle grade students' perception of

competency. The survey ended with demographic questions used to delineate a student's gender and grade level. Demographic factors were key in the final comparative element of the study, to recognize the similarities of the school populations to support the study (Creswell & Guetterman, 2019). Table 3 shows the design of the survey tool and how each prompt fits into the targeted sections.

Table 3

Classification of Survey Items

Aspect of Student Agency	Questions	Source
Scale	Likert-based 1- strongly agree … 5 – strongly disagree	Validated instruments
Motivation	I do an assignment during class because I think the activity is interesting. I do an assignment during class because I think I am supposed to do it. I do an assignment during class because I think the activity is good for me. I do an assignment during class because I want to. I do an assignment during class because I don't have a choice. I do an assignment during class because I feel good when doing the activity.	Guay et al., 2000 Situational Motivational Scale
	I like the feeling of finishing any assignment I begin. It is important for me to be a hard worker with school work. I continue steadily toward my goals. I don't give up easily. In my classes, I find learning to be enjoyable.	Pane et al., 2015 RAND Corporation's Personalized Learning Student Survey
Choice	I have opportunities to choose what instructional materials, such as books or computer applications, I use in class. I work on different topics or skills than what my classmates are working on at the same time. I am given the chance to work through	Pane et al., 2015 RAND Corporation's Personalized Learning Student Survey

	instructional materials at a faster or slower pace than other students in my class.	
	My opinions are respected in this school.	
	I can be creative in classroom assignments and projects.	
	I am comfortable being myself at this school.	
	If I could choose a school right now, it would be this school.	
Competency from digital personalized learning	It is important to me that I learn a lot of new concepts this year.	Pane et al., 2015 RAND Corporation's Personalized Learning Student Survey
	One of my goals in school is to learn as much as I can.	
	It's important to me that I completely understand my schoolwork.	
	When I am working on an assignment or activity, I know the goals of what that assignment or activity are.	
	I keep track of my learning progress by using technology (for example, I view an online grade book or use a portfolio).	
	I have opportunities to review or practice new material until I really understand it.	
	I'm certain I can master the skills taught in school this year.	
	I have confidence I can figure out how to do the most challenging school assignments.	
	I can do almost all the work assigned in school if I don't give up.	
	Even if the work is hard, I can learn it.	
	Before I begin working on an assignment, I think about the things I will need to do to complete that assignment.	
	I use what I've learned from previous assignments and what I have learned in school to do new assignments.	
	I can apply what I learn in class to real-life situations.	
	When I'm learning something new, I try to connect the things I'm learning about with what I already know.	

Note: Instruments used in construction of survey are aligned in third column to denote derivation of items.

With a young demographic of participants, the prompts were designed for readability and understanding by middle grade students (Cohen et al., 2007). The questions were presented to three middle school educators to assess understandability of the target age group. Some minor wording changes were implemented. For example, one panel expert suggested changing one motivation scale item from, *I do an assignment in class by personal decision*, to, *I do an assignment in class because I want to.* The Combined SIMS/PLS tool was constructed to answer the proposed research questions addressing targeted elements of student agency: motivation, choice, and competency (Ben-Eliyaho & Bernacki, 2015; Brooks & Young, 2011; Gehlbach et al., 2016; Guay et al., 2000; Kiefer et al., 2015; Pane et al., 2015). Each school site provided access to an electronic device for students to complete the survey.

The researcher administered the survey through the Qualtrics™ platform (Qualtrics, 2021). Students had access via a URL provided by the researcher on the day of the survey. The URL was tested by school personnel on selected devices prior to the actual date of the study. The study is aimed at understanding the actual microsystem level environment of the learners (Bronfenbrenner, 1977, 1979; Johnson & Puplampu, 2008; Onwuegbuzie, 2013). Therefore, the survey was administered on location at each participating school site campus or at a designated at home study space, used during remote learning due to COVID-19 restrictions (Sass, 2021). In consideration of social distancing restraints due to COVID-19, surveys were conducted by the MS and CPS teachers and administrators. The researcher provided school administrators a link to video instructions and the Qualtrics™ survey (2021). The administrator in turn provided the survey link to participating middle school students. Video instructions were provided by the researcher and posted on an unlisted YouTube channel (see Appendix I). For four of the school sites, a representative staff member was present in the participating classrooms while surveys

were completed, to assisted students in gaining access and provide necessary minor supervision. One school site allowed participants to take the survey from a remote location at a designated time. COVID-19 restrictions did not allow the school to have students on site on the date of the survey (Avery et al., 2021; Sass, 2021). The online survey took approximately 8 minutes to complete. Students ill or absent on the day of the survey did not participate.

Qualitative semi-structured focus groups. Focus groups are a common form of qualitative methodology in exploring human and social settings (Creswell & Creswell, 2018). The subsequent focus groups in this mixed-methods study followed a semi-structured design (Onwuegbuzie & Collins, 2007). Occurring after the quantitative survey collection process, the qualitative portion of the study used semi-structured focus groups with open-ended questions to discover perceptions of school experiences (Creswell & Guetterman, 2019; Wong & Cooper, 2016). All surveyed students were invited to volunteer to participate in the semi-structured small group discussions as a follow-up measure to better understand the learner perspective of student agency pertaining to motivation, choice, and competency. A diverse group of students from each study site was selected by school personnel to participate. Participants represented varying grade levels, genders, and ethnicities. Prompts for discussion in semi-structured focus groups stem from information obtained from the initial quantitative data (Creswell & Guetterman, 2019; Onwuegbuzie & Collins, 2007). As is typical of qualitative data collection processes, the focus group session followed a piloted protocol (see Appendix F) (Creswell & Guetterman, 2019). The protocol included an introduction of the researcher and the focus group process. The researcher presented the purpose of the session, guidelines for the interaction, and set expectations for an open conversation. Furthermore, students were given another opportunity to give assent as a

minor participant, stating there would be no negative ramifications for deciding to stop participation at any time.

Four focus groups, consisting of small groups of four to six students at each school site, were completed (Creswell & Guetterman, 2019). Due to COVID-19 restrictions, the researcher met with each focus group via a video-conferencing meeting application. The web-conferencing platform enabled digital recording, with the participants and the researcher in attendance. One group of participants engaged in the focus group in a classroom together, sharing a screen. For the remaining three groups, some participants engaged from a home-based study area, designed for COVID-19 shelter-in-place schooling conditions, and some were on the school campus in supervised locations. Each student participant joined from the familiar current schooling environment, whether from a home-study location or an on-campus school setting. Due to the nature of the virtual meeting, a school staff member was on site for supervision of students physically in classrooms. Furthermore, administrators were available via cell phone for text messaging and email for the duration of the focus group session. Each focus group session lasted approximately 45 minutes. As the researcher followed the consistent semi-structured focus group protocol (see Appendix F), a cohesive element was added to the quantitative data collection process across the participating school sites (Murawska & Walker, 2017). As is appropriate in qualitative data collection, the researcher facilitated the focus groups and used the record feature on the video-conference application, to create an audio and video version of each focus group session (Marshall & Rossman, 2016). To assess accuracy, all focus group audio recordings were transcribed and replayed (Creswell & Guetterman, 2019). The qualitative data was coded and themed separately based on the two participating learning environments, with the MS data as one set and the CPS data as a separate set.

Urie Bronfenbrenner's Bio-ecological Model from the '70s is appropriate to act as a framework for quantitative, qualitative, and mixed-methods studies (Onwuegbuzie et al., 2013). The explanatory sequential mixed-methods design worked to capture quantitative data in the form of a survey, and qualitative data in the form of semi-structured focus groups (Ackley, 2019; Creswell & Guetterman, 2019; Wong & Cooper, 2016). The qualitative element explored student perceptions of student agency in the classroom, specifically focused on motivation, choice, and competency. Utilizing the data received from the initial survey as a baseline, the researcher met with students from each of the sample schools (Creswell & Guetterman, 2019; Wong & Cooper, 2016). Students provided insight into learner perceptions as subjects directly experiencing the tenor of the classroom. During the semi-structured focus group sessions, each student was encouraged to share individual perceptions on topics addressed in the quantitative survey (Ackley, 2019; Creswell & Guetterman, 2019). Based on methodology of previous studies, the follow-up interviews served to deepen understanding and describe trends in the classroom contexts (Ackley, 2019; Creswell & Guetterman, 2019; Kleden, 2015; Lin-Siegler, Ahn, et al., 2016; Storz & Hoffman, 2013).

School sites selection checklist. Due to the unique settings required for this study, the researcher determined specific factors required in school sites labeled "micro-school" and in school sites labeled "conventional private school" sites. The MS, a 21st-century innovative school model, consists of a small mixed-age student body, an open student-centered environment, personalized learning through digital devices, and collaborative project work (Artz, 2018; Cohen, 2017; Horn, 2016; Kapoor, 2015; Katzman & Horn, 2016; Koteskey, 2018). Many new private and charter schools are designed to combine the expediency of educational technology in the classroom and student-centered learning structures apart from the boundaries

set by districts (Artz, 2018; Cohen, 2017; Darling & Gelernter, 2017; Katzman & Horn, 2016; Koteskey, 2018; Miller et al., 2014). For this study, selected MSs met the following established criterion to participate:

- The micro-school must be a charter or private school started after the year 2000
- The micro-school provides a population of 150 or fewer students
- The micro-school uses personalized learning as a frequent method of instruction
- The micro-school has an open classroom layout
- The micro-school claims to operate with a student-centered philosophy
- The micro-school includes mixed-age groups in one classroom area

An established criterion was also noted for participating CPS:

- The school must be a non-public school
- The school must enroll students from middle or upper middle-class families
- The school has access to a technology lab or other e-devices at least once a week
- The school is structured with a conventional closed classroom design
- The school follows a traditional designation of student placements by age and grade level

The researcher used the School Sites Selections Checklist tool in two phases (see Appendix G). Checklist A was used on an initial website review of potentially participating schools. If the school appeared to meet the established criteria from information available on the web, the researcher moved to Checklist B. The second checklist included a list of items to confirm via a phone call or email conversation with the administrator. To use the checklist, the researcher performed a web search for private schools in the United States. Selecting a few MSs, Checklist A was used as a gatekeeper for determining if a school would be an appropriate site. Finding one of the schools to be a fit, a follow-up phone call was made to determine how well

Checklist B worked in determining the presence of set study criterion. Each participating school site in the study met the established criterion. The MS and CPS were appropriate environments to explore student motivation, choice, and competency, elements of student agency according to Checklists A and B.

Analytical Methods

This study followed the explanatory sequential mixed methods design for data analysis of both CPS and MS settings (Bowen et al. 2017; Creswell, 2012; Creswell & Guetterman, 2019; Maxwell, 2013). The deliberate sequence of the elements allowed the qualitative focus groups of the study to be informed by the initial quantitative survey results from both CPS participants as well as MS participants (Bowen et al., 2017: Creswell & Guetterman, 2019; Onwuegbuzie & Collins, 2007). The mixed-methods design enabled multiple levels of analysis of students' perception of the learning environment (Creswell, 2012; Onwuegbuzie et al., 2013). To begin, there was a need to use statistical analysis to interpret the quantitative data extrapolated from the surveys. Qualitative methodologies help the researcher examine individuals' perspectives of an experience (Bowen et al., 2017). Lastly, the researcher analyzed and interpreted the qualitative data through descriptive coding (Saldana, 2016). Table 4 displays the elements of the mixed-methodology and how each research question was addressed.

Table 4

Research Questions and Tests

Research Question	Mixed-Methods Test	Independent Variable	Dependent Variable
How does the micro-school learning environment impact a middle grade student's perception	Quantitative: - Frequencies - Group Comparisons Mann Whitney U	School type environment perceived motivational aspects	Student perception of motivation

of student agency in regard to a sense of motivation?	Qualitative: - Focus group sessions rendered transcripts - Coding - Categorization - Theme development		
How does the micro-school learning environment impact a middle grade student's perception of student agency in regard to a sense of choice?	Quantitative: - Frequencies - Group Comparisons Mann Whitney U Qualitative: - Focus group sessions rendered transcripts - Coding - Categorization - Theme development	School type environment perceived level of choice	Student perception of choice
In what ways does the micro-school learning environment's use of a personalized learning platform impact student agency in regard to a middle grade student's sense of competency?	Quantitative: - Frequencies - Group Comparisons Mann Whitney U Qualitative: - Focus group sessions rendered transcripts - Coding - Categorization - Theme development	School type environment elements perceived contributing to competency	Student perception of competency

Quantitative analysis. Analysis of survey data requires a plan (Fink, 2003). The research questions initially captured the student perception of three targeted areas of student agency, including motivation, choice, and competency, through the use of a quantitative survey

instrument. Non-experimental quantitative studies are commonly performed ex post facto when studying school environments (Hoy & Adams, 2016). Students in the three MS environments completed a 32-item survey with prompts providing a Likert-scaled response on a 5-point scale (see Appendix E) (Hoy & Adams, 2016). The items on the survey allowed for responses ranging from 1-Strongly Agree to 5-Strongly Disagree (Mertler, 2016). A control group of students from grade-leveled classrooms in two CPS environments responded to an identical survey (Maxwell, 2013).

IBM SPSS Statistics is commonly used statistical software for analyzing quantitative studies (Creswell & Creswell, 2018; Fink, 2003). IBM SPSS was used to investigate frequencies and descriptive statistics at an initial level of analysis. Frequencies allow the researcher to view the mode as central tendency in the analysis of survey responses (Field, 2017; Fink, 2003). The researcher identified the Reported Frequency of responses by item, by Combined SIM/PLS sub-scale, and by school type. The frequency analysis revealed multiple items with a majority of agreeability on each scale for both MS and CPS participant groups. No item was met with complete disagreeableness by either school type. Specific frequency outcomes are presented and discussed in Chapters IV and V.

The survey requested participants to respond to identical Likert-scaled items (Hoy & Adams, 2016). Given the inability of the researcher to fully understand the actual difference between one individual's sense of the value of, for example, a disagree vs. strongly disagree, or an agree vs. a strongly agree, the scale did not represent actual fixed ratio values (Frey, 2016). The researcher performed a non-parametric Mann Whitney U test to determine a comparison of the sets of data from MSs and CPSs (Fink, 2003; Frey, 2016). The Mann Whitney U test results indicated responses to five questions on the survey varied significantly. Three of the responses

were in the Motivation Scale of the Combined SIM/PLS, and one item in each of the other sub-scales, the Choice Scale and the Competency Scale, showed a statistically significant variance.

The resulting statistics helped to examine similarities, differences, and idiosyncrasies of the compared MS and CPS groups' perceptions within the context of school type (Fink, 2003). The Mann Whitney U statistic revealed any statistical significance of variance among participating group ranked responses (Fink, 2003). The two-tiered method provided triangulation of data to indicate the level of similarity or dissimilarity of perceived agency across the MS settings, and in comparison, to the CPS classrooms (Ben-Eliyaho & Bernacki, 2015; Bowen et al., 2017; Creswell, 2012; Creswell & Guetterman, 2019; Maxwell, 2013).

Qualitative analysis. Student semi-structured focus groups were used in the qualitative portion of the study. Qualitative methods require a systematic plan for audio recording and transcription (Cohen et al., 2007; Marshall & Rossman, 2016). The video-conferencing platform, an online software application, embeds an audio and video recording feature. Each recording was sent to a transcriptionist. In the transcription process, participants were assigned a pseudonym to protect identities, and final transcripts were provided to the researcher (Creswell, 2012). The transcripts were then coded, using a descriptive coding system to determine common themes (Bowen et al., 2017; Marshall & Rossman, 2016; Saldana, 2016). Descriptive or topical coding is recognized as a scholarly process of analysis of transcripts (Bowen et al., 2017; Gonzalez, 2016; Saldana, 2016; Thomas & Cooper, 2016).

Themes were identified through a multiple reading process with a focus on repetition and patterns (Creswell & Poth, 2018; Maxwell, 2013). On the first read, the researcher obtained a general sense of the overall message of the individual respondent, creating memos in margins of printed transcripts (Marshall & Rossman, 2016; Maxwell, 2013). Next, the transcript was

highlighted for word frequency (Saldana, 2016). Words and phrases such as “motivates me,” “choice,” “want,” or “grades” were highlighted then tallied. Unique implications such as a description of students’ voice as “taken seriously” were marked (Marshall & Rossman, 2016). Words or concepts mentioned more than three times were deemed as repeated concepts. The concepts were placed on a color-coded list and categorized by organic themes (Bowen et al., 2017; Marshall & Rossman, 2016; Maxwell, 2013; Saldana, 2016). After topical coding and frequency counts, the researcher compiled a list of categories emerging within the separate school type sample groups (Marshall & Rossman, 2016). The data sets were compared to discover any relationships or variations between the level of perceived student agency amongst the MS students and the control group, CPS students, in traditional classroom settings. Categories were created to recognize consistencies between groups as well as contrasting concepts (Bowen et al., 2017; Maxwell, 2013). Finally, the researcher drafted a report to describe commentaries and display themes appearing in the data (Marshall & Rossman, 2016; Maxwell, 2013; Saldana, 2016).

Comparative analysis. This study’s research design includes a comparative component (Cohen et al., 2017). To clarify the term, the data collected from the under-researched MS models as a group was compared to the data collected from two other participating CPSs. The same mixed-methods explanatory sequential design was used to determine the level of student agency in regard to noted areas of student agency, and included motivation, choice, and competency within both research settings. The CPS data served as a control for a comparative analysis to the participating MSs’ data. The data sets were analyzed multiple times and at various levels to determine a deeper understanding of the sense of agency of participants in MS and CPS models (Creswell, 2012).

With the quantitative data, each research question was evaluated by comparative analysis of frequencies between the MS groups and the CPS groups. Research Question one, "How does the MS learning environment impact a middle grade student's perception of student agency in regard to a sense of motivation?" was addressed with the first eleven items on the survey. Each item related to students' perception of motivation. Research Question two, "How does the micro-school learning environment impact a middle grade student's perception of student agency in regard to a sense of choice?" was addressed by the next seven items. The third scale, including fourteen items, on the survey addressed Research Question three, "In what ways does the micro-school learning environment's use of a personalized learning platform impact student agency in regard to middle grade student's sense of competency?" Table 3, above, displays the tests and variables used to answer each question.

Validity and Reliability

Validity and reliability must be considered at the outset of research design (Cohen et al., 2007; Mertler, 2016). Researchers must consider the validity of the data collection tools, the sampling methods, the construct of protocols, and the consistency of carrying out the plan (Cohen et al., 2007; Maxwell, 2013; Onwuegbuzie & Collins, 2007). To confirm trustworthiness of the data, the researcher engaged a variety of commonly practiced validating protocols including triangulation, ensuring similarity of participants, providing similar accessibility, involving content experts in survey and focus-group protocol construction, and piloting of both quantitative and qualitative phases (Creswell & Creswell, 2018; Onwuegbuzie & Collins, 2007).

The use of explanatory sequential design applied both quantitative and qualitative elements to capture student perceptions (Bowen et al., 2017; Creswell & Creswell, 2018; Wong & Cooper, 2016). The initial phase elicited responses from middle grade participants on a survey

(Creswell, 2012; Onwuegbuzie et al., 2013). The secondary phase investigated a more holistic student viewpoint through semi-structured focus-group interviews (Mertler, 2016). The data from both phases allowed for triangulation, a research practice which approaches data collection differently and substantiates findings (Marshall & Rossman, 2015; Onwuegbuzie & Collins, 2007).

The researcher addressed reliability by confirming participating schools met the predetermined criterion for MS: fewer than 150 students enrolled, mixed-age learner spaces, a student-centered philosophy, and technology-based personalized learning (Artz, 2018; Crischelle, 2020; Curry & Mania, n.d.). Simultaneously the researcher sought CPS classrooms to serve as a control group (Maxwell, 2013). The participating CPS classrooms consisted of similar age students, teacher-directed lessons, and technology as an additional element. The consistent use of the school site checklists in the selection process increased the reliability of the data sets (see Appendix G) (Maxwell, 2013). In regard to analysis, the combined MS student group was viewed as one cohort and the CPS student group was viewed as a separate cohort. The online survey platform provided reliable and accessible data (Marshall & Rossman, 2016). Data was also reliable, as student responses shared on personal survey instruments has proven to be an accurate measure of student perception (Cho & Littenberg-Tobias, 2016).

The Bio-ecological model philosophy holds children should be studied in the natural environment (Bronfenbrenner, 1977). Regardless of setting, each participating school used an online survey designed and administered in Qualtrics™ (2021). Students took the survey on a computer provided by the school or on an individual electronic device. The participants engaged with digital devices in the most familiar and natural way in the study as possible. Data collection reliability was high, as student participants had direct access from the school site leader or

teacher. Other individuals in the adjacent areas, parents or teachers, were not permitted to influence the student to answer in any particular manner. The researcher created a video with instructions to be viewed before the administration of the survey (see Appendix I). The researcher entrusted the links to the instructional video and Qualtrics™ survey to participating school site administrators (Qualtrics, 2021). Students participated either on site at school or connected from a home study area due to COVID-19 restrictions. The survey sessions, including the instructional and set up time, took less than 30 minutes. The researcher virtually attended the semi-structured focus groups. To continue a sense of the current familiar learning environment, qualitative focus group meetings took place online either in a classroom on the school campus or from a home study area, familiar to the students.

Validated tools can be combined to create a blended instrument (Mameli et al., 2019; Oriol et al., 2017). The quantitative survey instrument, Combined SIMS/PLS, was designed using two validated survey instruments (Guay et al., 2000; Pane et al, 2015; Reeve & Tseng, 2016). The survey was based on empirically studied instruments and was piloted prior to the study to ensure the survey captured student perception of the targeted elements of student agency. The online survey tool – Qualtrics™, presented the Likert-scaled Combined SIMS/PLS survey with answers ranging from 1-Strongly Agree to 5-Strongly Disagree (Marshall & Rossman, 2016; Qualtrics, 2021). The Content Validity Index (CVI) is a commonly utilized approach to compute the reliability of a survey instrument (Shi et al., 2012; Zamanzadeh et al., 2015). A CVI was performed to validate the 46-item Combined SIMS/PLS instrument (Koller et al., 2017; Messick, 1988). Literature recommends 5 – 10 experts comprise a panel of experts in conducting a CVI (Gilbert & Prion, 2016). Nine experts, consisting experienced educators familiar with middle grade student experiences, served as panelists to evaluate the prompts for

clarity, readability, and appropriateness for the topic and middle school aged students (Gilbert & Prion, 2016: Koller et al., 2017; Mertler, 2016). Experts may rank the appropriateness of items, rather than an all-or-nothing categorization (Gilbert & Prion, 2016; Messick, 1988; Zamanzadeh et al., 2015). The expert opinions of relevance were collected on a digital survey. The CVI ranking scale included 4 options. An expert's rank of 4 or 3 meant the question was highly relevant or relevant respectively to the study. Likewise, a ranking of 2 or 1 meant the presented question was only somewhat relevant or not relevant to the study (Zamanzadeh et al., 2015). Panelist responses were tabulated, and a percentage was calculated in the process of identifying the I-CVI, or item content validity (Shi et al., 2012; Zamanzadeh et al., 2015). An average of all item scores results in a scale-CVI (S-CVI/Ave (Zamanzadeh et al., 2015). Research identifies a S-CVI/Ave greater than 0.90 has excellent content validity (Shi et al., 2012). After initial review, the S-CVI/Ave of Likert-scaled items returned at 87.5%. The panelists suggested small edits to wording for clarity and understandability. In a second review of the final Combined SIMS/PLS survey items, the nine-person expert panel demonstrated a universal agreement, S-CVI/Ave, of 90.86%. The calculated CVI reveals the content validity of an instrument (Gilbert & Prion, 2016). Experts concluded the combination of the elements of each of the original tools did not conflict or significantly modify the expected outcomes. Table 7 describes the panelists, professional educators, able to speak from an expert perspective on middle school appropriate content.

The quantitative section used the Combined SIMS/PLS student survey to gather demographic information on gender, grade level, and number of years attending the school. Likert-scaled questions for each of the sub-scales of the instrument were designed to discover the student opinion (Marshall & Rossman, 2016; Veiga, 2016). The survey captured data regarding a

perception of personal skills of noted elements of student agency, a student's motivation, sense of choice, and to measure a perceived sense of competency. MS participants and CPS participants were given identical surveys to increase validity and consistency (see Appendix E).

Cronbach's alpha was run using SPSS on each scale relating to the research questions, motivation, choice, and competency to statistically determine internal reliability of the resulting data set from the Combined SIMS/PLS (Cortina, 1993; Joseph & Macgowan, 2019; Mertler, 2016). Participant responses were loaded into a singular data set in SPSS. Cronbach's alpha for the eleven items of the Motivation Scale resulted in coefficient alpha of .824 ($\alpha = .824$). The Choice Scale, consisting of seven items, yielded a Cronbach's alpha of .807 ($\alpha = .807$). The Competency Scale resulted in a score of .916 ($\alpha = .916$). Cronbach's alpha was calculated for the total Combined SIMS/PLS with a high alpha of .942 ($\alpha = .942$) indicating strong internal reliability. A score above .70 indicates an adequate level of internal validity (Cortina, 1993; Creswell & Creswell, 2018). Cronbach's alpha for each of the scales was more than sufficient to confirm internal validity on the actual complete responses of N = 119 (Cortina, 1993).

Phase two of the research design included the qualitative portion of the study (Mertler, 2016). Semi-structured student focus groups involved discussions with middle grade participants. Interviewing children requires a differentiated approach in comparison to interviewing adults (Cohen et al., 2007; Penn, 2005). In order to establish trust, the researcher thanked the students for the time and described the purpose of the study (Cohen et al., 2007). To avoid any sense of threat or anxiety, the researcher used age-appropriate language and an inviting tone (Cohen et al, 2007). Each interview was held online via a video-conferencing application with the researcher after an introduction by an adult familiar to the students. The focus groups took place in a combination of classroom settings or individual home workspaces. The 30 to 45-minute sessions

were both video and audio recorded and transcribed (Creswell & Guetterman, 2019). Transcriptions of recordings of interview sessions were created using the audio and video recording feature on the video-conference application. Students commented on overall satisfaction with school experience and were led into questions meant to examine perceptions of elements of student agency. Each session included prompts on student agency, such as, "What are things that happen in your lessons or classes that motivate you to be a good student? Can you give me an example of a time this happened?" The researcher remained open to other questions as presented by students to help provide a deeper context for understanding the survey results (Creswell & Guetterman, 2019).

To address face validity concerns, the researcher employed a repeatable semi-structured focus group protocol (Cohen et al., 2007; Marshall & Rossman, 2016). The face validity protocol allows experts to check the understandability and coherence of the question flow in the semi-structured focus group protocol (Joseph & Macgowan, 2019). Three reviewers were acquired to review the protocol (see Appendix F). An introductory section was followed by an outlined list of potential focus group questions. A panel of expert educators, a middle school teacher, a counselor, and an administrator, read and responded to the proposed protocol (see Table 11) (Cohen et al., 2007). The experts determined the flow and wording was appropriate for middle school students and made minor suggestions such as ensuring students felt comfortable with the technology platform and looking ahead to troubleshoot any connectivity issues.

Pilot of the survey. Piloting an instrument reduces the risk of unexpected problems during the actual study and serves to confirm both validity and reliability (Cohen et al., 2007; Fink, 2003; Mertler, 2016). Furthermore, the pilot gives the researcher an idea of the length of time to complete the survey (Creswell & Creswell, 2018). In a pilot study, a classroom of middle

grade students utilized the resulting 32-item survey in a mock online session. The pilot study participants were selected using convenience sampling (Cohen et al., 2007; Fink, 2003; Jacobi, 2018). The students were available at a local non-participating school. The participants were in grades 6 – 8 and were selected based on the ability to access the practice session on a personal electronic device. Student scores were checked for internal reliability through calculating Cronbach's alpha (Cortina, 1993; Joseph & Macgowan, 2019). The pilot survey included twenty-one participants from a CPS enrolled in grades 6 – 8. Cronbach's alpha is a common measure of internal validity (Mertler, 2016). The resulting data was analyzed to determine internal reliability using Cronbach's alpha (Cortina, 1993; Mertler, 2016; Joseph & Macgowan, 2019). The total Cronbach for the pilot of the Combined SIMS/PLS denoted strong internal reliability with a high alpha score of .868 ($\alpha = .868$). The data sets internal reliability were analyzed for each scale. The survey included three scales as targeted focuses of student agency: motivation, choice, and competency. The coefficient alpha for motivation, choice, and competency scales each met and exceeded the $\alpha > .70$ threshold (Cortina, 1993). The survey subsections of Motivation and Choice both revealed an alpha of .703 ($\alpha = .703$). The subsections of Competency indicated a slightly stronger level of reliability with an alpha of .776 ($\alpha = .776$). Each section met the threshold for strong internal reliability (Cortina, 1993). The value indicates strong internal reliability of the instrument (Cortina, 1993; Creswell & Creswell, 2018).

Pilot of semi-structured focus groups. To determine usability of the protocol, the semi-structured focus-group protocol was piloted (Creswell, 2012; Marshall & Rossman, 2015). The step allowed the researcher to practice the flow and content with a group of similar students before the actual focus-groups sessions occurred. Pilot participants had previously completed the quantitative survey. To establish trust with young participants, the researcher began the pilot

with appreciation and an explanation of the purpose of the session (Creswell & Creswell, 2018). Participants were told the purpose was to understand how middle grade students would interact with the design of the session. After the survey, participants were invited to provide feedback to the researcher. To mitigate adult-child sense of power distance, students were informed there would be no impact on grades or recorded school performance based on participation in the discussion session (Creswell & Creswell, 2018; Penn, 2005). Participants enjoyed the discussion, felt the questions were understandable, and proposed no changes to wording or content. Piloting interviews also provides the opportunity to consider realistic coding choices on collected data (Saldana, 2016). The researcher learned to draw quieter students out by calling names directly.

Limitations

Educational research models, as with all human studies, possess limitations (Cohen et al., 2007; Joseph & Macgowan, 2019; Marshall & Rossman, 2016). While limitations are integral to the research design, serving as boundaries for the elements of the study, limitations also constrain a full understanding of the topic of study (Marshall & Rossman, 2016). The limitations of the current study include an open rating scale, the complexity of capturing data at a single point in time, the small sample size, researcher bias, and the move to remote learning due to COVID-19 restrictions for in-person instruction.

Surveys requesting respondents to provide data on a rating scale have limitations (Cohen et al., 2007). The impossibility persists to fully understand how an individual views the difference between rating scaled numbers (Cohen et al., 2007). The student survey in this study presented participants with a Likert-scaled rating system. Therefore, the researcher has a limited understanding of the exact meaning of a Strongly agree vs. an Agree or a Disagree vs. a Strongly disagree. Educational research may involve both objective and subjective elements

(Lopez-Alvarado, 2017). The follow-up qualitative focus groups as part of the study's research design aided in mitigating the gap in understanding (Creswell & Guetterman, 2019).

While a comparative study presents data juxtaposing two school settings, the researcher acknowledges a complex set of variables may affect outcomes (Cohen et al., 2007). The study captures one day in one school year at multiple sites, yet events do not represent a static state of being and the larger story of how students perceive the classroom's context will continue to evolve (Cohen et al., 2007). Studies are limited in scope (Cohen et al., 2007). The outcomes of comparing the student perceptions, while excluding teacher and parent perceptions, may limit the depth of understanding elements of student agency. The geographic participation of a study causes limitations. This study is limited in scope by the inclusion of only schools located in the Midwestern and Western region of the United States. The sample size is relatively small compared to the population of American middle grade learners. Furthermore, the study is limited to learning about middle grade students from families participating in school choice. Parents selecting a non-public school represent a section of society generally with higher socio-economic status (Potterton, 2020; Rodgers, 2014). While the sample size at each school site was small, less than 50, the total sample size when combining all participants from MSs was adequate at 75 (Onwuegbuzie & Collins, 2007). However, the control or CPS in the study provided a smaller sample for comparison. As minors, students also must agree to participate (Creswell & Guetterman, 2019). Only students with parent-signed consent forms were able to complete the study, leaving some voices unheard. Furthermore, the student sample was not an exact balance of gender. However, the student experience in this study is seen as a whole, not as a gender-based study.

Studies may be limited by the number of participant voices included as representative of the group (Creswell & Creswell, 2018). The method of critical case sampling in the study limited student voices to individuals enrolled and attending a school of choice, either a MS or CPS (Onwuegbuzie & Collins, 2007). Evidently, the participant's family is willing to take risks in alternative educational models. The researcher was limited as to the extent family philosophy impacted student perceptions, as communicated in the survey. Participants in the focus groups must also have previously completed the survey. The researcher is limited in understanding student participant's willingness to reveal honest feedback, possibly feeling the need to portray positivity about school. The situation remains, the survey collected self-reported data (Mertler, 2016). The researcher sought to mitigate any feelings of students needing to respond positively about the school by informing students no grade was attached to participation.

Researcher bias plays a role in educational studies and protections must be built in to mitigate the impact on interpretations of results (Creswell & Creswell, 2018). One value of mixed-methods research is a reduction of bias resulting from triangulation in data collection (Creswell & Creswell, 2018). In this mixed-methods study, the second qualitative phase allows for substantiating results and leads to a deeper understanding of the initial quantitative results (Maxwell, 2013; Mertler, 2016). Peer debriefing was practiced throughout the data collection and examination processes (Mertler, 2016). The debriefing served to verify the processes resulted in robust and accurate explanations (Mertler, 2016). Finally, the researcher utilized bracketing in the coding process to ensure the explanation involved actual words used by participants in the discussions (Creswell & Creswell, 2018).

A further limiting factor was the time frame in which the study took place. The fall semester of 2020 was impacted by the COVID-19 pandemic orders to close school buildings,

disallow gatherings, and increase the use of technology for delivery of instruction (Avery et al., 2021; Washington, 2021). Regions across the U.S. were impacted differently. None of the school sites in this study were able to allow the researcher to come to campus to interact face-to-face with students. Video-conferencing focus groups with middle school students may have limited a sense of openness and flow in the conversations. The fact the majority of students experienced school building closures in 2020 greatly increased the use of edtech on a daily basis. The increased usage due to the pandemic restrictions may complicate the ability to discern the impact of the MS environment on this area of competency.

The limitations reveal the extent to which the findings of the study can or should be applied to alternate contexts (Marshall & Rossman, 2016). As this study focuses on MS and CPS settings, the findings may not be generalizable to the greater population of educational models (Maxwell, 2013). However, the outcomes may inform and inspire future studies on the effect of the learning environment on student agency.

Role of the Researcher

The researcher, an administrator of a private school in the San Francisco Bay Area, was a doctoral student in Northwest Nazarene University's Educational Leadership PhD program during the time of the study. As expected for a mixed-methods approach, the researcher recognized personal perspectives, experience, and intellect would be an influential element of the project (Maxwell, 2013; Penn, 2005; Ravitch & Riggan, 2017). The researcher served as sole designer and required assistance from on-site educators to administer the online survey. After securing appropriate locations, participants were obtained, surveys conducted, and semi-structured focus groups directed. The researcher was communicator, participant as data collector, and processor. The researcher hired a transcriptionist to convert the audio from the focus-groups

to written scripts. Care was taken to remain neutral in communication with administrators at each school (Cohen et al., 2007; Maxwell, 2013). To ensure ethical practices, an NIH certificate for completion of training on protecting human research participants was obtained (see Appendix J) (Lopez-Alvarado, 2017).

Chapter IV

Results

Introduction

The purpose of this study is to examine the impact of the unique MS environment on the development of student agency in regard to motivation, choice, and competency for middle grade students (Mameli et al., 2019; O'Neill, 2015; Oluwatayo et al., 2016; Wolff et al., 2020; Wall et al., 2018). MSs in the 21st century present a remarkable innovative trend in school reform (Horn, 2015; Prothero, 2016; Templeton Academy, 2018). A small student population, a student-centered philosophy, mixed-age groupings of learners, integration of personalized learning platforms, and teachers as guides or co-learners are factors indicative of MSs in the United States (Artz, 2018; Cohen, 2017; Cuban, 2017; Horn, 2016; Kapoor, 2015; Katzman & Horn, 2016; Linaberger, 2018; Templeton Academy, 2018). The MS model is understudied as the format began as a movement in the early 2000's (Cohen, 2017; Crischelle, 2020; Horn, 2016; Katzman & Horn, 2016; Koteskey, 2018; Miller et al., 2014; Russo, 2017).

Student agency, the ability and responsibility of a student to act on behalf of oneself to engage in learning, is a critical component of 21st century education (Avery et al., 2021; Mameli et al., 2019; Reeve & Tseng, 2011; Zeiser et al., 2018). The development of student agency is an increasing focus for 21st century learners and a common goal of MSs (Templeton Academy, 2018; Mameli et al., 2019; Zeiser et al., 2018). The MS student-centered philosophy targets the development of non-cognitive skills related to student agency (Cohen, 2017; Crischelle, 2020; Currie & Mania, n.d.; Horn, 2016; Kapoor, 2015; Koteskey, 2018). Specifically, MS leaders provide an environment to increase motivation, choice, and competency for students (Crischelle, 2020; Templeton Academy, 2018).

MSs across the United States serve K–12 learners, yet middle grade students, in a developmentally transitional period, are the focus of this study (Eisenbach et al., 2020; Kim et al., 2014; Starks et al., 2018). Middle grade students, representing the Alpha Generation and Gen Z cohorts, are tech-savvy and value choice in learning experiences (Kapoor, 2015; McCrindle, 2020; Schroth, 2019; Southgate, 2017; Tarbutton, 2018). Digital natives only know a technology integrated world and expect to have power to make decisions within environments (Apaydin & Kaya, 2020; Deed et al., 2014; Prensky, 2001; Southgate, 2017; Tarbutton, 2018). For middle grade learners, motivation to achieve in school may diminish as an individual questions one's value and place in the social context (Akos, 2004; Harter, 1982; Kiefer et al., 2015). Literature speaks to the impact of peer relationships on school achievement for the age group (Kiefer et al., 2015; Kim et al., 2014). Middle grade students are in an awkward state of human development and the sense of competency may fade during pre-adolescence (Akos, 2004; Kim et al., 2014).

Examining student perceptions of three elements of student agency: motivation, choice, and sense of competency, through both quantitative and qualitative approaches is an initial step in examining the novel MS model. As a mixed-methods comparative study, the researcher followed an explanatory sequential design (Bowen et al., 2017; Creswell & Creswell, 2018; Wong & Cooper, 2016). The research design captures student perspectives of a population from three MS alongside a sample population from two CPS. The examination of student agency is guided by the following research questions.

1. How does the micro-school learning environment impact a middle grade student's perception of student agency in regard to a sense of motivation?
2. How does the micro-school learning environment impact a middle grade student's perception of student agency in regard to a sense of choice?

3. In what ways does the micro-school learning environment's use of a personalized learning platform impact student agency in regard to a middle grade student's sense of competency?

The Bio-ecological framework, conceived by Urie Bronfenbrenner in the late 20th century, serves as a theoretical framework for the study (Bronfenbrenner, 1977; Ashiabi & O'Neal, 2015). The framework suggests nested layers of influence in the human child's environments have a strong interconnected impact on the individual's development (Bronfenbrenner, 1977; DiBenedetto & Myers, 2016; Johnson & Puplampu, 2008; O'Neill, 2015). The school setting exists in Bronfenbrenner's innermost element, the microsystem (Brendtro, 2006; Bronfenbrenner, 1977, 1979; Onwuegbuzie et al., 2013). Quantitative and qualitative data may yield different results in a given context (Creamer, 2018; Creswell, 2012). This study is placed in two school settings, the innovative MS and the traditional CPS.

Chapter IV presents the results of the quantitative and qualitative findings of the sequential mixed-methods design to address each of the three research questions. The chapter provides tables, charts, and visual displays of outcomes. Initially, the researcher provides a description of the instruments and participants along with a discussion of validity and reliability. Next, the quantitative results are presented followed by discoveries from qualitative semi-structured focus groups. Data is displayed from both the MS and CPS school groups within the sections addressing each research question, and a comparison of MS and CPS outcomes is woven throughout.

Data Collection Instruments

Survey instrument. The Combined SIMS/PLS survey was composed using Qualtrics™ online application (Qualtrics, 2021). Table 5 identifies each element of the survey. The digital

format began with a brief introduction of the survey to the student including a brief purpose statement, an indication the school and parents had approved of participation in the survey, and an approximate amount of time the activity could take. The initial screen invited personal assent, directing the participant to click the forward arrow to share opinions. Next, a simple, two-sentence list of instructions guided participants to express feelings by clicking on the answer best describing personal feelings as each prompt was displayed. To examine three concepts of student agency: motivation, choice, and competency, the researcher combined elements of two, previously published surveys, the Situational Motivational Scale (SIMS) and the Personalized Learning Student Survey to construct the following 32-items (Brooks & Young, 2011; Currie, 2018; Guay et al., 2000; Pane et al., 2015). The previously validated surveys were selected due to the content each presented related to the targeted concepts (Guay et al., 2000; Pane et al., 2015). The SIMS involved six specific survey items addressing motivation, a key element of Research Question 1 (Guay et al., 2000). The Personalized Learning Student Survey provided five more prompts addressing student motivation (Pane et al., 2015). Furthermore, the Personalized Learning Student Survey addressed both choice and competency, the two remaining targeted concepts, providing data collection in related survey items to Research Question 2 and Research Question 3 (see Appendix E) (Pane et al., 2015). The instrument concluded with demographic questions used to identify a student's gender and grade level. Demographic factors made the comparative element of the study possible as the researcher was able to determine the similarities of the samples to support the study (Creswell & Guetterman, 2019).

Table 5

Structure Combined SIMS/PLS

Scale	N	Items	SCALE
Introduction and Instructions	2	1, 2	
Research Question 1: Student Perception of Motivation	11	3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	SIMS PLS
Research Question 2: Student Perception of Choice	7	14,15, 16, 17, 18, 19, 20	PLS
Research Question 3: Competency	14	21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34	PLS
Demographic items: Grade level, gender, years of attendance at school	3	35, 36, 37	n/a
Assent: Participate in qualitative focus-groups, Student name	2	38, 39	

A link to a customized school-site survey was provided to each participating school administrator. Administrators delivered the link to participants via direct email at the time of the survey. The 32 prompts requested responses on a Likert scale ranging from 1–Strongly Agree, 2–Somewhat Agree, 3–Neither Agree nor Disagree, 4–Somewhat Disagree, or 5–Strongly Disagree. The survey data was collected and disaggregated by participant group type. MS responses, representing three schools served as one data set. CPS responses, representing two schools, comprised the second set.

Semi-structured focus-group protocol. In existing literature, explanatory sequential design is utilized in educational research to begin with a collection of quantitative data and follow up with a clarifying collection of qualitative data (Ackley, 2019; Bowen et al., 2017;

Creswell & Guetterman, 2019; Kiefer et al., 2015; Onwuegbuzie & Collins, 2007; Zainuddin, 2018). The research design's intentional sequence enabled the researcher to review the quantitative data in preparation for the qualitative portion of the study (Ackley, 2019; Creswell & Guetterman, 2019; Mertler, 2016; Onwuegbuzie & Collins, 2007). The semi-structured focus group protocol (See Appendix F) was designed to draw out student perceptions of elements of student agency. Questions for the qualitative aspect of the study were crafted in light of the analysis of the quantitative results (Creswell & Guetterman, 2019; Mertler, 2016; Onwuegbuzie & Collins, 2007). The prompts served as a catalyst to address the topics of the research questions, motivation, choice, and competency. To ensure content relevance and validity, the researcher conducted an expert panel review and a pilot video-conference focus-group with students of a similar demographic (Marshall & Rossman, 2016).

Participants Profile

Survey participants. The validated student survey was provided to an administrator at each vetted and selected MS or CPS. The participating MS sites were located in three separate states in the Midwestern and Western region of the United States. MSs were identified and reviewed through an online search followed by email and phone communication with the building administrator. Schools met defined criteria in size, status as independent, and philosophy (see Appendix G). MSs met the following qualifications:

- The micro-school must be a charter or private school started after the year 2000
- The micro-school provides a population of 150 or fewer students
- The micro-school uses personalized learning as a regular method of instruction
- The micro-school has an open classroom layout
- The micro-school claims to operate with a student-centered philosophy

- The micro-school includes mixed-age groups in one classroom area

Qualities required of participating CPSs included:

- The school must be a non-public school
- The school must enroll students from middle or upper middle-class families
- The school has access to a technology lab or other e-devices at least once a week
- The school is structured with a general conventional closed classroom design
- The school follows a traditional designation of student placements by age and grade level

Critical case random sampling was used to select student participants (Onwuegbuzie & Collins, 2007). In order to capture the broadest spectrum of student perspectives in the defined environments, all enrollees in middle grades at each of the five vetted and selected school sites were given the opportunity to participate. The resulting participants consisted of a random sample of middle grade students from school sites having met prescribed criteria. Students and parents were sent an electronic communication directly from participating school administrators regarding the potential to participate in the study. Participants were invited based on the condition of attending a particular type of school (Onwuegbuzie & Collins, 2007). A total of 119 middle grade students representing both school types participated in the study as displayed on Table 6. Three groups were comprised of MS students, and two groups were comprised of CPS students.

Table 6

Demographics of Participants by School Type

Demographic	Micro-Schools	Conventional Private Schools	% of Total
Sample Size Grade Levels			
Fourth	5	0	4.2
Fifth	6	10	13.4
Sixth	17	17	28.6
Seventh	26	10	30.3
Eighth	21	7	23.5
Gender			
Female	30	20	42
Male	35	22	47.9
Other	10	2	10.1
Micro-School Students			
MS1 site 1	21		
MS2 site 2	18		
MS3 site 3	36		
Total	75		63
Conventional School Students			
CPS1 site 4	10		
CPS2 site 5	34		
Total	44		37

Note: Schools listed by type only. Identity of individual participating schools not included to protect anonymity.

Semi-structured focus group participants. Individuals in the same context tend to develop differing perceptions of the environment (Cohen et al., 2007). Student perceptions are an important aspect of educational research, as teachers and parents may experience a phenomenon differently (Akos, 2004). Two MSs and two CPSs hosted online semi-structured focus groups.

Purposeful sampling was used to select participants for the qualitative semi-structured focus groups (Maxwell, 2013; Mertler, 2016; Robinson, 2014). As a prerequisite, each focus group participant must have previously participated in the student survey for the study (Hands, 2014; Lemley et al., 2014; Storz & Hoffman, 2013). Administrators at each school site assisted in selecting focus group participants to ensure a variety of participant voices. The school site leader assistance allowed the researcher to gather a representative group to include diversity in gender and grade level. Purposeful sampling ensured a range of voices for focus group methods (Maxwell, 2013). The diverse representation of the focus groups is displayed on Table 7. Qualitative methods represent more depth than breadth and do not require a large number of participants (Marshall & Rossman, 2016). Educational research standards require embedded samples to include more than 3 participants per sub-group (Onwuegbuzie & Collins, 2007). Table 7 displays demographics describing focus group participants. Each focus group included 4 – 5 middle school students, for an overall qualitative participant population of 19 students (Creswell & Guetterman, 2019). The group represents 16% (19 out of 119) of the original sample of survey participants. The participant gender representation included 11 females, 7 males, and 1 genderqueer individual. One member of each group self-identified as being new at the school.

Table 7

Qualitative Participants Demographics

Qualitative Focus Group Members **BY SCHOOL SITE**	Gender	Grade	***SELF-IDENTIFIED aS A NEW/TRANSFER STUDENT**
MS1			
Student 1	F	8	
Student 2	M	8	+
Student 3	M	4	+
Student 4	F	6	+
Student 5	F	4	*
MS3			
Student 1	F	7	
Student 2	M	7	*
Student 3	GQ	8	+
Student 4	F	6	
CPS1			
Student 1	F	5	*
Student 2	F	5	+
Student 3	F	6	
Student 4	F	6	
Student 5	M	6	
CPS2			
Student 1	M	5	
Student 2	F	7	+ *
Student 3	M	6	
Student 4	F	7	+
Student 5	M	7	+

Note: Participant names unlisted to protect anonymity of minors. GQ = Genderqueer in the gender identity category. + = Non-white ethnicity.

School Site Profiles.

The following profiles provide a description of the philosophy and setting of participating schools. Considering ethical protocols, it is valuable to maintain confidentiality (Saldana, 2016). The narratives do not provide in-text citations as revealing online sources would remove anonymity.

Micro-school 1 (MS1) profile. The first micro-school, located in an urban area, was founded in 2014 by a businessman and father desiring to provide a more student-centered, interest-driven school for today's learners. Current total enrollment rests around 40 learners. The school's mission is to challenge learners to make a difference in the world. The school's philosophy is learner-driven and built around mixed-age classrooms, project-based learning, personalized digital platforms for core skills, and apprenticeships. Rather than grades, students show mastery through a series of earned badges. Projects center around real-world experiences. Students collaborate across ages, including with adults employed by the school and with others in industry. In the setting, teachers are called guides, facilitating rather than ordering the educational process. The learning environment consists of two open classrooms with flexibility in scheduling and learning topics. Each student has an individualized learning plan based on skill level, personal interests, and goals. MS1 provided 21 participants for the quantitative portion of the study and 5 participants for the qualitative portion of the study.

Micro-school 2 (MS2) profile. With a student-centered philosophy and focus on middle grades, MS2 opened in 2016 in a large urban environment. The school promotes self-discovery and learning through real-world experiences for approximately 90 enrollees each year. MS2 provides a mixed age setting for learners. The school offers an environment with learner goals related to social and relational development as well as academic learning. MS2 describes success

through goals related to human flourishing, focusing students to live out a meaningful life, develop connections to others, and take action in important world matters. The school aims to build a sense of identity and agency for interacting in the world beyond the campus and in one's future endeavors. MS2 rests on key elements of educating the whole person such as multiple intelligences, agency, motivational strategies, student choice, and community investment. Teachers, referred to as guides, are tasked with modeling and mentoring, rather than direct instruction. The curriculum includes individualized learning opportunities, personalized goal setting, apprenticeships, topical seminars, excursions, and interactions with real-world experts. MS2 provided 18 participants for the quantitative portions of the study only.

Micro-school 3 (MS3) profile. Micro-school 3 opened in 2004 and was intentionally designed to meet the learning needs of students in grades 6 – 12. While the administration holds the total student population to 100 or less, the school facility has grown to include a gymnasium, art studio, design lab, dance and performance theater, outdoor classrooms, a makerspace, and indoor learning spaces. The school facility is located in a suburban area in the Western region of the United States. MS3's mission focuses on curiosity, inquiry, adventure, relationships, and character. Teachers are considered guides, coaches, and mentors. Values include experiential learning, solving real-world problems, developing close-knit relationships, recognizing individual worth, and working with experts. The flexible schedule and surrounding rugged landscape allows students to be in a variety of instructional settings in any given term. Learning may occur in a field on a day excursion, on a backpacking trip, or in a tech company think tank. Curriculum follows an interdisciplinary approach involving real-world projects. Students work individually on personalized learning platforms as well as in collaborative mixed-age groups. MS3 provided 36 participants for the quantitative portion of the study and 4 participants for the

qualitative portion of the study.

Conventional private school 1 (CPS1) profile. The first CPS, opening in 1982, has a total population of approximately fifty students in grades K–6. Middle grade students are grades 5–6. Located in the Western region of the United States, the school resides outside a small city in a suburban area. The campus is located in an area surrounded by agricultural lands. Classrooms at CPS1 segregate students into traditional grade levels. The school embraces a classical ideology for the educational program, including academic rigor and development of character. The stated mission includes a desire to prepare students for life, rather than simply the next level of school. The school philosophy is teacher-centered with a shared focus on direct instruction of character and faith as well as academic content. The school encourages community-mindedness through school activities such as music concerts, a science fair, and a history day event. CPS1 reports small class sizes allowing for a family-like environment and individualized instruction. Teachers hold state credentials, and courses are taught in a traditional subject-area arrangement on a teacher-determined schedule. The school offers specialty classes in music, foreign language, technology, art, religion, and physical education. Course standards and content are set by the school as advised by state and national standards. In the current year, middle grade students are in a combination class of grades 5/6. Students in middle grades access electronic devices to participate in teacher-directed learning activities. Students from CPS1 accounted for 10 quantitative participants and 5 qualitative participants in the study.

Conventional private school 2 (CPS2) profile. The campus enrolls approximately 730 students in grades K–12, about 200 in the middle grades. A more urban environment than CPS1, CPS2 was founded in 1971 and is located on two campuses near three major cities. Middle grade students share a campus with students in the high school program. The school regards faith and

religious instruction as the primary mission. The philosophy is founded on the belief humans need Christian truth for a successful life. The school focuses on values such as self-discipline, responsibility, respect, patriotism, and moral decision-making. Additionally, the school offers high level academics on a traditional schedule. Middle grade students experience subject area matter taught by qualified teachers through a conventional classroom. The teacher-centered approach honors the traditional authority structure in which trained educators determine and lead curriculum content and pacing. Other learning targets include critical thinking, creativity, effective communication, citizenship, and application of spiritual principles to life. The students interact with other grade levels, near the same age, at lunchtime and breaks. To enrich the learner experience, CSP2 provides extensive sports and fine arts programming for students wishing to participate in extra-curricular activities. Students from CPS2 accounted for 34 quantitative participants and 5 qualitative participants in the study.

Mixed Methods Validity and Reliability

Validity and reliability must be addressed within all research designs (Cohen et al., 2007; Creswell, 2012; Mertler, 2016). The explanatory sequential mixed-methods design brings the quantitative and qualitative elements into alignment in a step-by-step process and is well-suited to address the presented research questions (Bowen et al., 2017; Creswell, 2012; Creswell & Guetterman, 2019; Keifer, et al., 2015; Kleden, 2015; Leithwood & Azah, 2017; Onwuegbuzie & Collins, 2007). The study design required the development of both quantitative and qualitative data collection tools, a student survey and a student semi-structured focus group protocol (Bowen et al., 2017; Creamer, 2018). The study instruments were evaluated through an expert panel CVI process (Koller et al., 2017; Shi et al., 2012). A piloting process served to test each instrument prior to use in the study and ensured the validity of scoring and needed content

collection for each individual research tool (Creswell & Guetterman, 2019).

Survey Validity and Reliability

Regarding the quantitative survey portion of the study, the researcher addressed validity and reliability concerns on multiple levels. First, in designing the survey, the combined instrument was based on two previously validated tools, the Situational Motivational Scale (SIMS) and the Personalized Learning Student Survey (PLS) (Brooks & Young, 2011; Currie, 2018; Guay et al., 2000; Pane et al., 2015). Student responses shared on personal survey instruments has proven to be an accurate measure of student perception (Cho & Littenberg-Tobias, 2016). The research project took place in the fall semester of 2020. Current COVID-19 restrictions prevented the researcher from being on site to administer the survey. To increase validity, the researcher attempted to create a similar survey experience across school sites. Students participated either on site at school or connected digitally from a designated home study area. The MS and CPS classrooms were given access to identical surveys (see Appendix E). The date and time of the survey for each site was determined by the school administrator according to school schedules. As the survey was in progress, the researcher confirmed student responses were fully submitted to the Qualtrics™ database (2021). All participants viewed the researcher-created instructional video prior to engaging with the survey (see Appendix I). Administrators provided the links to both the instructional video as well as the survey on the designated date. Participants used a familiar electronic school device to access the online survey designed and administered through the Qualtrics™ platform (Qualtrics, 2021).

Content validity index. In order to confirm the readability and understandability of the survey for the middle grade study participants, the researcher followed a CVI process (Gilbert & Prion, 2016; Koller et al., 2017; Messick, 1988; Shi et al., 2012). Literature identifies a need for

greater than five and fewer than ten experts to serve as panelists in determining content validity (Gilbert & Prion, 2016). Nine experienced educators, including individuals familiar with middle grade student experiences, served as panelists to evaluate the prompts for clarity, readability, and appropriateness for middle school aged students (Koller et al., 2017; Mertler, 2016). Expert panelists rated the Combined SIMS/PLS survey prompts as to the relevance or non-relevance to sub-scale topics of motivation, choice, and competency (Koller, et al., 2017). The expert panel should be comprised of a variety of individuals with differing professional levels (Gilbert & Prions, 2016). The panel consisted of both public and private school professional educators with direct experience with middle grade students. The panelists ranged in educational level from bachelors to doctoral level qualifications. Table 8 displays data describing nine members of the content validity panel.

Experts rated the appropriateness of items on a four-point scale (Messick, 1988; Zamanzadeh et al., 2015). The provided CVI ranking scale allowed four responses. The rank of 4 or 3 meant the expert deemed the item was highly relevant or relevant respective to the study. Likewise, a ranking of 2 or 1 meant the expert considered the item somewhat relevant or not relevant to the study (Zamanzadeh et al., 2015). A tabulation of panelist responses was created and a percentage calculated to identify the I-CVI, or item content validity (Shi et al., 2012; Zamanzadeh et al., 2015). The I-CVI of the Combined SIMS/PLS items returned at 87.5% on initial review. Literature identifies a S-CVI/Ave greater than 0.90 has excellent content validity (Shi et al., 2012). Panelists suggested minor wording edits for clarification and understandability by middle grade students. On review, the nine-person expert panel showed a S- CVI/Ave of 90.86%.

A color-coded chart (see Appendix H) indicates the panelists scoring of the questions and the resulting Item-CVI values. The green rows are descriptive headings. The red highlighted prompts have a calculated I-CVI < .70, being labeled by panelists at the 2 or 1 ranking (Gilbert & Prion, 2016; Koller et al., 2017; Zamanzadeh et al., 2015). The yellow highlighted prompts' I-CVI are > .70, but less than .79. Validity processes in research direct a closer look at items with a mean above .70 for possible modification (Koller et al., 2017; Zamanzadeh et al., 2015).

Items not highlighted, met or exceeded the 79% requirement for validity (Gilbert & Prion, 2016; Zamanzadeh et al., 2015). Seven of the prompts, labeled red, fell well below the necessary standard of 70% confirmation and were eliminated from the original 46 item question set (Gilbert & Prion, 2016). Items highlighted yellow fell just outside of the range and were re-worded and recast to three of the original panelists for further review. After rewording, six of the seven yellow prompts were accepted by the panelists as very relevant or quite relevant. The seventh item, *I normally have opportunities to choose what topics I focus on in my learning*, was identified as only somewhat relevant and was removed from the study (Gilbert & Prion, 2016). The expert panel results predicted the combination of the elements of instruments, including 32 Likert-scaled items, would not conflict with or significantly impact results.

Table 8

Content Validity Index Expert Demographics

Years of Educational Experience	Gender	Position	Education/ Certification	Institution
27	M	K-8 Principal	MS, MA, Admin Cred.	Private
21	M	K-12 Superintendent	PhD, Teaching Cred.	Private
33	M	High School Superintendent	JD, Admin Cred.	Private
34	M	K-12 Head of Schools	BA, MA, Teaching Cred.	Private
13	F	School Counselor	EdS	Public
24	M	Director of Elementary Education	BA, MA	Public
17	M	Educational Specialist	BA, MA, Sped Cert.	Public
20	F	Middle School Teacher	BS, Teaching Cred.	Private
39	M	K-8 Principal	BA, MA, Admin Cred.	Private

Survey pilot. Piloting an instrument is a research practice which both illuminates unanticipated problems and confirms both validity and reliability in the data collection process (Cohen et al., 2007). The researcher performed a pilot study using the Combined SIM/PLS instrument with a group of middle grade students. A pilot study may involve a small number of participants (Creswell & Guetterman, 2019). Twenty-one middle school students at a private school, not involved in the formal study, were used to pilot the quantitative survey instrument. Similar to the study design, students took the survey on school approved electronic tablets in a familiar learning environment. After the survey, the researcher asked students to provide feedback as to the level of effectiveness of the instrument. In particular, the inquiry requested opinion related to the structure of the tool, as well as clarity and readability of the prompts. Students stated the survey was understandable for middle grade students. With only positive

feedback from pilot participants, no modifications were made to the wording of the tool.

The researcher facilitated the pilot survey in a remote format. Middle school students accessed the survey via a link using the Qualtrics™ platform (Qualtrics, 2021). The pilot online session participants were selected using convenience sampling (Cohen et al., 2007; Fink, 2003; Jacobi, 2018). The students were known to the researcher and actively participating in a remote learning structure during COVID-19 restrictive conditions. Pilot participants, described on Table 9, included students in grades 6 – 8 and were selected based on the ability to access the piloted survey session on a provided electronic device. Table 9 displays demographics of the pilot survey group.

Table 9

Quantitative Pilot Survey Group Demographics

Factor	Label	N
Grade Level		
	6	11
	7	9
	8	1
Gender		
	Male	9
	Female	9
	Prefer Not to Say	3
Length of Time Enrolled		
	< 1 Year	8
	1 – 2 Years	4
	3 Years or More	9

Cronbach's alpha of pilot survey. Cronbach's alpha was calculated to confirm internal reliability of the pilot data set (Cortina, 1993; Joseph & Macgowan, 2019). The overall Cronbach for the pilot of the Combined SIMS/PLS indicated strong internal reliability with a high alpha rating of .868 (α = .868). Included subscales within the Combined SIMS/PLS pilot data were disaggregated and examined to confirm internal reliability. Each scale presented a set of prompts targeted to provide data for each individual research question. SPSS was used to analyze the individual data sets. The Motivation Scale results yielded a Cronbach's alpha of .703 (α = .703). exceeding the necessary .70 threshold. The pilot results on the Choice Scale also yielded an alpha of .703 (α = .703). Finally, the Competency Scale results had a calculated alpha of .776 (α = .776). Table 10 displays the pilot results indicating Cronbach's alpha at an acceptable level to confirm internal consistency for the Combined SIMS/PLS survey.

Table 10

SPSS Output Cronbach's Alpha – Pilot of Combined SIMS/PLSA

Scale	N	Items	Cronbach's Alpha
Research Question 1: Motivation	11	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	.703
Research Question 2: Choice	7	12, 13, 14, 15, 16, 17, 18	.703
Research Question 3: Competency	14	19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32	.776
Total Combined Scales:	32	All	.868

Cronbach's alpha of final survey. To confirm internal consistency the researcher used SPSS to calculate Cronbach's alpha on each scale with the actual study results (Cortina, 1993; Field, 2017). The Cronbach's alpha calculated for the total Combined SIMS/PLS indicated

strong internal reliability with high alpha rating of .942 (α = .942). The figures on Table 11 display the outcomes and identifies the survey items related to each scale. The eleven-item motivation scale serves to address the impact of environment on middle grade students' perception of motivation, Research Question 1. The calculation indicates the alpha coefficient at .824 (α = .824), suggesting strong internal consistency. The seven-item choice scale serves to address the impact of environment on middle grade students' perception of choice, Research Question 2. The calculation indicates a Cronbach's alpha of .807 (α = .807), suggesting strong internal consistency. The fourteen-item competency scale serves to address the impact of environment on middle grade students' perception of competency, Research Question 3. The calculation indicates Cronbach's alpha of .916 (α = .916), suggesting very strong internal consistency. The Cronbach's alpha outcomes validate the survey instrument to confidently conduct the comparison of MS student perceptions and CPS student perceptions on the topics presented in the study.

Table 11

SPSS Output Cronbach's Alpha – Combined SIMS/PLS

Scale	N	Items	Cronbach's Alpha
Research Question 1: Motivation	11	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	.824
Research Question 2: Choice	7	12, 13, 14, 15, 16, 17, 18	.807
Research Question 3: Competency	14	19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32	.916
Total Combined Scales:	32	All	.942

Semi-Structured Peer Focus Group Protocol Validity and Reliability

Face validity. Educational research suggests the focus group qualitative methodology is known to have a high level of face validity (Marshall & Rossman, 2016). A face validity process involving expert educators was followed to check the understandability and coherence of the question flow of a semi-structured focus group protocol (Joseph & Macgowan, 2019). Table 12 presents demographics for the three educators, a middle school teacher, a counselor, and an administrator, reviewers of the protocol (see Appendix F). The panelists determined the flow and wording was appropriate for middle school students and made minor suggestions. For example, the middle school teacher suggested simplifying a question from "When you are able to pick for yourself …" to "When you can choose . . ."

Table 12

Face Validity Index Experts

Years of Educational Experience	Gender	Position	Education/ Certification	Institution
32	F	Guidance Counselor	BA, Counselor Certification	Private
20	M	Middle School Teacher	BA	Private/Public
14	F	Middle School Principal	BA	Private

Semi-structured focus group pilot. As is typical of qualitative data collection processes, the focus group session followed a piloted protocol (see Appendix F) (Creswell & Guetterman, 2019). Piloting elements of a study serves to equip the researcher with unapparent shortcomings of the design and prepare for circumstances possibly arising during the actual study (Creswell & Guetterman, 2019; Marshall & Rossman, 2016; Maxwell, 2013). The semi-structured interview protocol was piloted prior to the study with a set of pre-supposed example prompts formulated as

a follow up of the quantitative survey pilot (Maxwell, 2013). The student interview protocol was designed to give students the opportunity to share a perception of student agency within the constructs of choice, motivation, and competency. The researcher engaged four learners from the initial quantitative pilot to again pilot the semi-structured focus group session (see Appendix F). The pilot focus group included three seventh grade students and one eighth grade student. The group consisted of two girls and two boys, as displayed on Table 13.

The pilot allowed for practice on the video conferencing platform with student participants using the video-conference application from an at-home study area. The 43-minute focus group session was video recorded and reviewed by the researcher. The pilot allowed the researcher to experience an initial idea of how middle grade students may interact during the online focus-group as well as the types of responses possibly occurring in the actual study (Maxwell, 2013). The researcher modified the introduction script to include less description of research and focus-group for students and allow more time for student commentary. The researcher determined the effectiveness of asking participants to raise a hand to indicate a desire to share a comment to avoid interrupting one another and to keep the flow of the conversation moving. A need to move through the three sections of the discussion in a balanced fashion was also recognized. Adding a structured approach allowed the researcher to compare outcomes from the various groups (Maxwell, 2013). Middle grade students needed to be prodded to give details to expound on the answers. The protocol was adapted for flow and further divided into specific sections for motivation, choice, and competency. Changes were implemented before the tool was used in the actual study (see Appendix F). Having completed the pilot of each of the tools, the researcher was able to use the instruments with confidence (Marshall & Rossman, 2016).

Table 13

Pilot Focus-Group Participants

Pilot Focus Group Members	Gender	Grade	***SELF-IDENTIFIED AS A NEW/TRANSFER STUDENT + NON-CAUCASIAN ETHNICITY**
Student 1	F	7	
Student 2	M	7	*
Student 3	M	8	+
Student 4	F	7	+

Quantitative Results

The study examines three aspects of student agency from the perspective of middle grade students in MSs in comparison to counterparts in CPSs. Each research question explores one element of student agency: motivation, choice, or competency. Initially, the researcher conducted a frequency analysis to determine the regularity of the number of incidence and magnitude of responses for the school type groups. Frequencies identify the mode as the central tendency and assist in identifying the level to which the sample group agrees or disagrees with an item on the survey (Field, 2017; Fink, 2003). A frequency chart was created to exhibit results related to each research question. The charts display how often middle grade students Strongly Agree or Somewhat Agree with the Likert-scaled items on the Combined SIMS/PLS instrument (see Tables 13, 16, and 19). The rating of Strongly Agree and Somewhat Agree are identified as the Reported Frequency, Neither Agree nor Disagree is a neutral position, and Disagree and Strongly Disagree are considered as levels of disagreeableness.

The researcher conducted a Mann Whitney U test to indicate any significant differences between the MS and CPS responses on the Combined SIMS/PLS tool (Fink, 2003; Frey, 2016).

The Mann Whitney U test compares the equality of median responses across two independent groups (Cohen et al., 2007; Fink, 2003). Overcoming non-normal distribution of survey data and individual outliers is accomplished by a calculation of the Mann Whitney, rather than an independent t test (Cohen, et al., 2007). The Mann Whitney U statistic depends on the median of ranked scores and serves as a representation of the data minimizing the influence of outliers (Field, 2017). The non-parametric test is used with the categorical independent variable of school type and the ordinal dependent variable of participant responses to Likert-scaled survey items (Cohen et al., 2007). Mann Whitney U tests indicated significance in a total of five of the 32 prompts across all sub-scales on the Combined SIMS/PLS. Results are organized by Research Question and presented below.

Results for Research Question 1: Middle Grade Student Sense of Motivation

The first eleven-item sub-scale on the Combined SIMS/PLS examines middle grade students' perception of motivation to answer the question: How does the micro-school learning environment impact a middle grade student's perception of student agency in regard to a sense of motivation? Each prompt elicited a response describing student perceptions of the motivation for completing schoolwork. Middle grade students liked the feeling of finishing assignments across school types, as MS participants scored an agreeable Reported Frequency of 77.3% (58 out of 75), and 90.9% (40 out of 44) CPS students responded similarly. Likewise, 77.3% (58 out of 75) of MS students and 90.9% (40 out of 44) of CPS students agreed on the sense of personal importance of being a hard worker with schoolwork. Two sentiments revealed high frequencies of agreeable response for CPS students, 84.1% (37 out of 44) possess an individual sense of drive to continue steadily toward goals and 77.3% (34 out of 44) do not give up easily.A minority of middle grade students do an assignment during class because they want to, for MS

students, only 37.3% (28 out of 75) and for CPS students 38.65% (17 out of 44) of CPS. The greatest discrepancy of frequency between two school types appears on the Motivation Scale, pinpointing a sixteen-point spread. On the item, 49.3% of MS students (37 out of 75) and 65.9% (29 out of 44) CPS students do an assignment during class because they feel the activity is good for them. Table 14 exhibits modes of responses for both groups for each survey item.

Table 14

Survey Frequency Results – Motivation Scale

Survey Item School	Type	Reported Frequency (Strongly and Somewhat Agree)	Strongly Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Strongly Disagree
I do an assignment during class because I think the activity is interesting.	MS	61.3	17.3	44.0	24.0	8.0	6.7
	CPS	61.4	4.5	56.8	25.0	11.4	2.3
I do an assignment during class because I think I am supposed to do it.	MS	72.0	49.3	22.7	18.7	2.7	6.7
	CPS	70.5	40.9	29.5	18.2	9.1	2.3
I do an assignment during class because I think the activity is good for me.	MS	49.3	22.7	26.7	30.7	13.3	6.7
	CPS	65.9	31.8	34.1	25	4.5	4.5
I do an assignment during class because I want to.	MS	37.3	17.3	20.0	24.0	29.3	9.3
	CPS	38.6	15.9	22.7	27.3	25	9.1
	MS	56.0	20.0	36.0	16.0	14.7	13.3

I do an assignment during class because I don't have a choice	CPS	54.5	29.5	25.0	29.5	6.8	11.4
I do an assignment during class because I feel good when doing the activity.	MS	46.7	8.0	38.7	24.0	17.3	12.0
	CPS	50.0	15.9	34.1	29.5	18.2	2.3
I like the feeling of finishing any assignment I begin.	MS	**77.3**	49.3	28.0	12.0	4.0	6.7
	CPS	**90.9**	68.2	22.7	0	9.1	0
It is important for me to be a hard worker with school work.	MS	**77.3**	49.3	28.0	12.0	5.3	5.3
	CPS	**90.9**	72.7	18.2	6.8	2.3	0
I continue steadily toward my goals.	MS	70.7	25.3	45.3	18.7	5.3	5.3
	CPS	**84.1**	43.2	40.9	11.4	2.3	2.3
I don't give up easily.	MS	61.3	26.7	34.7	21.3	8.0	9.3
	CPS	**77.3**	31.8	45.5	15.9	4.5	2.3
In my classes, I find learning to be enjoyable.	MS	61.3	13.3	48.0	28.0	6.7	4.0
	CPS	65.9	15.9	50	22.7	11.4	0

Note: "Reported Frequency" represents combined categories of responses "Strongly Agree" or "Somewhat Agree" for individual survey items. Emboldened yellow items indicate a significance of 75% or greater when identifying number of agreeable responses for each school type.

The non-parametric Mann Whitney U test was used to compare group responses with the ordinal dependent variable of Likert-scaled survey responses on each scale of the Combined SIMS/PLS instrument (Fink, 2003; Frey, 2016). The 5-point Likert scale allowed five responses, 1-Strongly Agree, 2-Somewhat Agree, 3-Neither Agree nor Disagree, 4-Somewhat Disagree, and 5-Strongly Disagree. The median of ranked scores serves as a representation of the data (Field, 2017). The resulting *z* score compared the median as the measure of central tendency across the

two independent groups, MS and CPS (Cohen et al., 2007). The *p* value was set at a significance level of $p < .05$ (Frey, 2016). The Mean Rank identifies the level of agreement by group type. When the non-parametric Mann Whitney U statistic was calculated to determine statistical significance between MS and CPS middle grade student perceptions of motivation, 3 of the 11 items on the Motivation Scale demonstrate a significant variance. Table 15 displays a summary of Mann Whitney U outcomes for the items on the Motivation Scale. The items marked, "Reject the null hypothesis" are emboldened in the lavender cells.

Table 15

Mann Whitney U Hypothesis Test Summary – Motivational Scale

Null Hypothesis	Test	Sig.[a,b]	Decision
The distribution of I do an assignment during class because I think the activity is interesting. is the same across categories of School Type.	Independent-Samples Mann Whitney U Test	.529	Retain the null hypothesis.
The distribution of I do an assignment during class because I think I am supposed to do it. is the same across categories of School Type.	Independent-Samples Mann Whitney U Test	.461	Retain the null hypothesis.
The distribution of I do an assignment during class because I think the activity is good for me. is the same across categories of School Type.	Independent-Samples Mann Whitney U Test	.085	Retain the null hypothesis.

The distribution of I do an assignment during class because I want to. is the same across categories of School Type.	Independent-Samples Mann Whitney U Test	.864	Retain the null hypothesis.
The distribution of I do an assignment during class because I don't have a choice is the same across categories of School Type.	Independent-Samples Mann Whitney U Test	.669	Retain the null hypothesis.
The distribution of I do an assignment during class because I feel good when doing the activity. is the same across categories of School Type.	Independent-Samples Mann Whitney U Test	.223	Retain the null hypothesis.
The distribution of I like the feeling of finishing any assignment I begin. is the same across categories of School Type.	Independent-Samples Mann Whitney U Test	**.029**	**Reject the null hypothesis.**
The distribution of It is important for me to be a hard worker with school work. is the same across categories of School Type.	Independent-Samples Mann Whitney U Test	**.008**	**Reject the null hypothesis.**
The distribution of I continue steadily toward my goals. is the same across categories of School Type.	Independent-Samples Mann Whitney U Test	**.027**	**Reject the null hypothesis.**

The distribution of I don't give up easily. is the same across categories of School Type.	Independent-Samples Mann Whitney U Test	.118	Retain the null hypothesis.
The distribution of In my classes, I find learning to be enjoyable. is the same across categories of School Type.	Independent-Samples Mann Whitney U Test	.588	Retain the null hypothesis.

Note: a. The significance level is .050. b. Asymptotic significance is displayed.

The Mann Whitney U calculation ranks the scores on an increasing scale (Field, 2017). Lower scores on the Combined SIMS/PLS indicate a greater level of agreement. The 5-point Likert scale allowed five responses: 1-Strongly Agree, 2-Somewhat Agree, 3-Neither Agree nor Disagree, 4-Somewhat Disagree, and 5-Strongly Disagree. Therefore, a lower Mean Rank of the Mann Whitney U correlates with an interpretation of higher student survey agreement (i.e. 1–Strongly Agree, 2–Somewhat Agree) and a higher Mean Rank aligns with a an interpretation of lower student survey agreement (5–Strongly Disagree, 4–Somewhat Disagree). Table 16 displays the results of statistically significant items on the Motivation Scale.

Results from the Mann Whitney U indicate the feeling of finishing an assignment was more agreeable for CPS (*Mean Rank* = 51.48) than MS students (*Mean Rank* = 64.27) (i.e. 1-Strongly Agree, 2-Somewhat Agree, etc.). The Mann Whitney U identifies a statistical difference ($p = .029$, $p < .05$). The Reported Frequency confirms the direction of the statistical difference between CPS and MS participants. The MS participants reported a frequency of 77.3% (58 out of 75,) and 90.9% (40 out of 44) CPS students responded with agreement. Overall, CPS students reporting liking the feeling of finishing an assignment more frequently than MS students.

Table 16

Mann Whitney Results – Significant Items on the Motivation Scale

Combined SIMS/PLS Item	MS Mean Rank	CPS Mean Rank	U Statistic	*z* Score	Sig.[a,b]	Effect Size
I like the feeling of finishing any assignment I begin.	64.27	51.48	1275.00	-2.188	**.029**	-.20
It is important for me to be a hard worker with schoolwork.	65.28	49.78	1200.50	-2.67	**.008**	-.246
I continue steadily toward my goals.	64.55	51.01	1254.50	-2.214	**.027**	-.203

Note. a. The significance level is .050. b. Asymptotic significance is displayed.

Furthermore, CPS participants (*Mean Rank* = 49.78) statistically perceive an importance of being a hard worker on schoolwork to a higher degree than MS students (*Mean Rank* = 65.28) (i.e. 1-Strongly Agree, 2-Somewhat Agree, etc.) ($p = .008$, $p < .05$). The Reported Frequency confirms the direction of the statistical difference between CPS and MS participants (Field, 2017). The MS students reported a frequency of 77.3% (58 out of 75) and 90.9% (40 out of 44) of CPS students responded similarly (Cohen et al., 2017).

Lastly, the Mann Whitney U test reveals a significantly higher perception of the importance of continuing steadily toward personal goals for CPS students (*Mean Rank* = 51.01) than MS students (*Mean Rank* = 64.55) (i.e. 1-Strongly Agree, 2-Somewhat Agree, etc.) ($p = .027$, $p < .05$) (Field, 2017). The Reported Frequency again confirms the direction of the statistical difference between CPS and MS participants. The MS Reported Frequency was 70.7% (53 out of 75) while the CPS students' frequency level was 84.1% (37 out of 44) on possessing an individual sense of ambition to continue steadily toward goals.

Results for Research Question 2: Middle Grade Students Perception of Choice

Seven items comprise the Choice Scale on the Combined SIMS/PLS survey to target Research Question 2. Middle grade student perception of choice is examined with the query: How does the micro-school learning environment impact a middle grade student's perception of student agency in regard to a sense of choice? The survey prompts address middle grade students' attitude toward choice in the school setting, including the opportunity for choice in comparison to others and how one may act in response to options offered. A majority of middle grade students, MS participants 65.8% (48 out of 73) and 59.1% (26 out of 44) of CPS participants, agree opportunities exist in class to choose instructional materials, such as books or computer applications. At a rate of 81.3% (61 out of 75) of MS participants and 75% (33 out of 44) CPS students perceive student opinions are respected in school. Middle grade students report they would choose the school currently attending, if allowed to select "right now," including 81.3% (61 out of 75) of MS participants and 75% (33 out of 44) CPS students. A clear discrepancy exists among students on perceived ability to be creative on classroom assignments and projects, with only 56% (42 out of 75) of MS and an overwhelming 88.6% (39 out of 44) of CPS responding in an agreeable manner. The thirty-two percentage-point spread is noteworthy. Table 17 displays the frequency of responses for MS and CPS groups for the choice scale.

Table 17

Survey Frequency Results – Choice Scale

Survey Question	School Type	Reported Frequency (Strongly and Somewhat Agree)	Strongly Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Strongly Disagree
I have opportunities to choose what instructional materials, such as books or computer applications, I use in class.	MS	65.8	31.5	34.2	19.2	6.8	8.2
	CPS	59.1	22.7	36.4	25.0	6.8	9.1
I work on different topics or skills than what my classmates are working on at the same time.	MS	44.0	17.0	28.0	32.0	16.0	8.0
	CPS	27.3	4.5	22.7	31.8	27.3	13.7
I am given the chance to work through instructional materials at a faster or slower pace than other students in my class.	MS	65.3	41.3	24.0	20.0	10.7	4.0
	CPS	72.7	38.6	34.1	11.4	13.6	2.3

My opinions are respected in this school.	MS	**81.3**	52.0	29.3	8.0	6.7	4.0
	CPS	**75.0**	43.2	31.8	20.5	2.3	2.3
I can be creative in classroom assignments and projects.	MS	56.0	20.0	36.0	16	14.7	13.3
	CPS	**88.6**	56.8	31.8	11.4	0	0
I am comfortable being myself at this school.	MS	70.7	42.7	28.0	13.3	9.3	6.7
	CPS	74.4	48.8	25.6	16.3	4.7	4.7
If I could choose a school right now, it would be this school.	MS	**81.3**	58.7	22.7	9.3	5.3	4.0
	CPS	**75.0**	63.6	11.4	20.5	4.5	0

Note: "Reported Frequency" represents combined categories of responses "Strongly Agree" or "Somewhat Agree" for individual survey items. Emboldened yellow items indicate a significance of 75% or greater when identifying number of agreeable responses for each school type.

The researcher used the Mann Whitney U test to compare ranked MS and CPS group responses on the Choice scale of the Combined SIMS/PLS instrument (Fink, 2003; Frey, 2016). The resulting *z* scores compared the median ranks across the two school type participant groups (Cohen et al., 2007). The *p* value remained at a significance level of $p < .05$ (Frey, 2016). When the non-parametric Mann Whitney U statistic was calculated to determine statistical significance between MS and CPS middle grade student perceptions of choice, a singular item on the Choice Scale indicated a significant variance. The item centers around student perception of the ability to work on different topics or skills than what classmates are working on at the same time. Table 18 displays a complete set of *U* scores for the Choice Scale of the Combined SIMS/PLS. The

statistically significant item marked, “Reject the null hypothesis,” is emboldened in the lavender cells.

Table 18

Mann Whitney U Hypothesis Test Summary – Choice Scale

Null Hypothesis	Test	Sig.[a,b]	Decision
The distribution of I have opportunities to choose what instructional materials, such as books or computer applications, I use in class. is the same across categories of School Type.	Independent Samples Mann Whitney U Test	.412	Retain the null hypothesis.
The distribution of I work on different topics or skills than what my classmates are working on at the same time. is the same across categories of School Type.	Independent-Samples Mann Whitney U Test	**.017**	**Reject the null hypothesis**.
The distribution of I am given the chance to work through instructional materials at a faster or slower pace than other students in my class. is the same across categories of School Type.	Independent-Samples Mann Whitney U Test	.834	Retain the null hypothesis.
The distribution of My opinions are respected in this school. is the same across categories of School Type.	Independent-Samples Mann Whitney U Test	.445	Retain the null hypothesis.
The distribution of I can be creative in classroom assignments and projects. is the same across categories of School Type.	Independent-Samples Mann Whitney U Test	.581	Retain the null hypothesis.

The distribution of I am comfortable being myself at this school. is the same across categories of School Type.	Independent-Samples Mann Whitney U Test	.471	Retain the null hypothesis.
The distribution of If I could choose a school right now, it would be this school. is the same across categories of School Type.	Independent-Samples Mann Whitney U Test	.709	Retain the null hypothesis.

Note: a. The significance level is .050. b. Asymptotic significance is displayed.

The Mann Whitney U calculation ranks the scores on a rising scale (Field, 2017). Lower scores on the Combined SIMS/PLS indicate more agreement. The Likert-scaled items allowed five responses: 1-Strongly Agree, 2-Somewhat Agree, 3-Neither Agree nor Disagree, 4-Somewhat Disagree, and 5-Strongly Disagree. Consequently, a lower Mean Rank associates with a lower statistical score, interpreting to survey agreement. Consequently, a lower Mean Rank of the Mann Whitney U is interpreted as higher student survey agreement (i.e., 1–Strongly Agree, 2–Somewhat Agree) and a higher Mean Rank is interpreted as lower survey agreement (i.e., 5–Strongly Disagree, 4–Somewhat Disagree). A higher Mean Rank associates with a higher statistical score, interpreting to survey disagreement. Statistical calculations for the significant item on the Choice Scale are displayed on Table 19.

Table 19

Mann Whitney U Results – Significant Item on the Choice Scale

Combined SIMS/PLS Item	MS Mean Rank	CPS Mean Rank	U Statistic	*z* Score	Sig.[a,b]	Effect Size
I work on different topics or skills than what my classmates are working on at the same time.	53.89	68.93	2043.00	2.384	**.017**	.22

Note. a. The significance level is .050. b. Asymptotic significance is displayed.

Results from the Mann Whitney U indicate a statistically stronger perception of working on different topics or skills than classmates for MS students (*Mean Rank* = 53.89) than CPS participants (*Mean Rank* = 68.93) (i.e. 1-Strongly Agree, 2-Somewhat Agree, etc.) ($p = .017$, $p < .05$) (Field, 2017). The researcher references the Reported Frequency to better understand the nature of the difference between MS and CPS participants (Cohen et al., 2007). At a frequency level of 44% (33 out of 75) MS students reportedly agreed to the ability to work at a different pace than classmates, compared to a frequency rate of 27.3 % (12 out of 44) CPS counterparts.

Results for Research Question 3: Middle Grade Students Perception of Competency

Using the fourteen-item Competency Scale on the Combined SIMS/PLS the researcher examined middle grade students' perception of competency to answer: In what ways does the micro-school learning environment's use of a personalized learning platform impact student agency in regard to a middle grade student's sense of competency? The Competency Scale seeks to examine student perception of the importance of learning, an ability to identify personal mental behaviors, and the belief of an individual's competence to learn. The majority of middle school participants, 78.7% of MS students (59 out of 75) and 84.1% of CPS (37 out of 44) students, report it is important to completely understand schoolwork. The highest Reported

Frequency for CPS 95.5% (42 out of 44) report it is important to learn a lot of new concepts in the current year. While not reaching the Reported Frequency level of .75, 72% MS participants (54 out of 75) students also agree it is important to learn a lot of new concepts in the current year. Furthermore, 75% (33 out of 44) CPS participants have a goal in school to learn as much as possible. MS students agree at a rate of 73.3% (55 out of 75) and CPS agree at an 81.8% (36 out of 44) when working on school assignments students know what the goals of the assignment or activity are. Middle grade students across both school types have opportunities to review or practice new material until really understanding it. A full 81.3% of MS students (61 out of 75) and 84.1% of CPS (37 out of 44) students agree to the sentiment. A majority of middle grade participants, 75% (33 out of 44) of CPS and 73% (54 out of 74) of MS, feel certain of the ability to master the skills taught in school this year. Likewise, MS 81.3% (61 out of 75) and CPS 81.8% (36 out of 44) participants feel middle school students can do almost all the work assigned in school when not giving up. Participants report learning is achievable even if the work is hard, at a rate of 82.7% (62out of 75) for MS students and 90.9% (40 out of 44) for CPS students. Eighty-two-point-seven percent (62 out of 75) MS participants and 90.9% (40 out of 44) for CPS students report to use learning from previous assignments in school to do new assignments. MS participants at a rate of 74.7% (56 out of 75) and 79.5% of CPS students (35 out of 44) try to connect current learning activities to what is already known. Both MS 61.3% (46 out of 75) and CPS 86.4% (28 out of 44) respondents report a majority agree to thinking about the things needed to do to complete an assignment before beginning the work. The high discrepancy of a 25-point spread between the two school types is noteworthy. Table 20 provides frequency data for the two groups in examination of perceived sense of competency.

Table 20

Survey Frequency Results – Competency Scale

Survey Question	School Type	Reported Frequency (Strongly and Somewhat Agree)	Strongly Agree	Somewhat Agree	Neither Agree nor Disagree	Some what Disagree	Strongly Disagree
It is important to me that I learn a lot of new concepts this year.	MS	72.0	40.0	32.0	17.3	5.3	5.3
	CPS	**95.5**	43.2	52.3	4.5	0	0
One of my goals in school is to learn as much as I can.	MS	59.5	21.6	37.8	25.7	9.5	5.4
	CPS	**75.0**	34.1	40.9	18.2	4.5	2.3
It's important to me that I completely understand my school work.	MS	**78.7**	42.7	36.0	12.0	4.0	5.3
	CPS	**84.1**	59.1	25.0	15.9	0	0
When I am working on an assignment or activity, I know the goals of what that assignment or activity are.	MS	73.3	20.0	53.3	18.7	2.7	5.3
	CPS	**81.8**	25.0	56.8	18.2	0	0
I keep track of my learning progress by using technology (for example, I view an online grade book or use a portfolio)	MS	72.0	42.7	29.3	13.3	8.0	6.7
	CPS	59.1	38.6	20.5	11.4	13.6	15.9

I have opportunities to review or practice new material until I really understand it.	MS	**81.3**	46.7	34.7	8.0	5.3	5.0
	CPS	**84.1**	52.3	31.8	13.6	2.3	0
I'm certain I can master the skills taught in school this year.	MS	73.0	32.4	40.5	20.3	6.8	0
	CPS	**75.0**	40.9	34.1	20.5	4.5	0
I have confidence I can figure out how to do the most challenging school assignments.	MS	64.0	21.3	42.7	20.0	8.0	8.0
	CPS	65.9	22.7	43.2	13.6	18.2	2.3
I can do almost all the work assigned in school if I don't give up.	MS	**81.3**	44.0	37.3	9.3	2.7	6.7
	CPS	**81.8**	54.5	27.3	11.4	4.5	2.3
Even if the work is hard, I can learn it.	MS	**82.7**	45.3	37.3	10.7	1.3	5.3
	CPS	**90.9**	47.7	43.2	4.5	4.5	0
Before I begin working on an assignment, I think about the things I will need to do to complete that assignment.	MS	61.3	22.7	38.7	22.7	8.0	8.0
	CPS	**86.4**	25.0	40.9	20.5	13.6	0
I use what I've learned from previous assignments and what I have learned in school to do new assignments.	MS	**80.0**	40.0	40.0	10.7	2.7	6.7
	CPS	**90.9**	43.2	47.7	9.1	0	0

I can apply what I learn in class to real-life situations.	MS	70.7	28.0	42.7	10.7	10.7	8.0
	CPS	65.9	25.0	40.9	20.5	11.4	2.3
When I'm learning something new, I try to connect the things I'm learning about with what I already know.	MS	**74.7**	36.0	38.7	14.7	2.7	8.0
	CPS	**79.5**	38.6	40.9	11.4	6.8	2.3

Note: "Reported Frequency" represents combined categories of responses "Strongly Agree" or "Somewhat Agree" for individual survey items. Emboldened lavender items indicate a significance of 75% or greater when identifying the number of agreeable responses for each school type.

MS and CPS group responses on the Competency scale of the Combined SIMS/PLS instrument were compared using the Mann Whitney U statistic (Fink, 2003; Frey, 2016). Resulting *z* scores compared the median ranks across the two school type participant groups (Cohen et al., 2007). The significance was retained at $p < .05$ (Frey, 2016). The Mann Whitney U calculation revealed a statistical significance between MS and CPS student perceptions of competency on a singular item on the Competency Scale. The perception of having a goal to learn as much as one can in school differs across school types. Table 21 displays a complete set of *U* scores for the Competency Scale of the Combined SIMS/PLS. The statistically significant item marked "Reject the null hypothesis" is emboldened in the lavender cells.

Table 21

Mann Whitney U Hypothesis Test Summary – Competency Scale

Null Hypothesis	Test	Sig.[a,b]	Decision
The distribution of It is important to me that I learn a lot of new concepts this year. is the same across categories of School Type.	Independent-Samples Mann Whitney U Test	.107	Retain the null hypothesis.
The distribution of One of my goals in school is to learn as much as I can. is the same across categories of School Type.	Independent-Samples Mann Whitney U Test	.050	Reject the null hypothesis.
The distribution of It's important to me that I completely understand my school work. is the same across categories of School Type.	Independent-Samples Mann Whitney U Test	.091	Retain the null hypothesis.
The distribution of When I am working on an assignment or activity, I know the goals of what that assignment or activity are. is the same across categories of School Type.	Independent-Samples Mann Whitney U Test	.232	Retain the null hypothesis.
The distribution of I keep track of my learning progress by using technology (for example, I view an online grade book or use a portfolio) is the same across categories of School Type.	Independent-Samples Mann Whitney U Test	.213	Retain the null hypothesis.
The distribution of I have opportunities to review or practice new material until I really understand it. is the same across categories of School Type.	Independent-Samples Mann Whitney U Test	.421	Retain the null hypothesis.

The distribution of I'm certain I can master the skills taught in school this year. is the same across categories of School Type.	Independent-Samples Mann Whitney U Test	.424	Retain the null hypothesis.
The distribution of I have confidence I can figure out how to do the most challenging school assignments. is the same across categories of School Type.	Independent-Samples Mann Whitney U Test	.854	Retain the null hypothesis.
The distribution of I can do almost all the work assigned in school if I don't give up. is the same across categories of School Type.	Independent-Samples Mann Whitney U Test	.314	Retain the null hypothesis.
The distribution of Even if the work is hard, I can learn it. is the same across categories of School Type.	Independent-Samples Mann Whitney U Test	.545	Retain the null hypothesis.
The distribution of Before I begin working on an assignment, I think about the things I will need to do to complete that assignment. is the same across categories of School Type.	Independent-Samples Mann Whitney U Test	.541	Retain the null hypothesis.
The distribution of I use what I've learned from previous assignments and what I have learned in school to do new assignments. is the same across categories of School Type.	Independent-Samples Mann Whitney U Test	.345	Retain the null hypothesis.
The distribution of I can apply what I learn in class to real-life situations. is the same across categories of School Type.	Independent-Samples Mann Whitney U Test	.883	Retain the null hypothesis.

The distribution of When I'm learning something new, I try to connect the things I'm learning about with what I already know. is the same across categories of School Type.	Independent-Samples Mann Whitney U Test	.611	Retain the null hypothesis.

Note: a. The significance level is .050. b. Asymptotic significance is displayed.

An increasing scale is used in the Mann Whitney U calculation of ranks (Field, 2017). The Likert scaled items allowed five responses: 1-Strongly Agree, 2-Agree, 3-Neither Agree nor Disagree, 4-Disagree, and 5-Strongly Disagree. Accordingly, a lower Mean Rank reveals a lower statistical score, interpreting survey agreement. A higher Mean Rank is associated with a higher statistical score, interpreting to disagreement. Accordingly, a higher Mean Rank of the Mann Whitney U is interpreted as lower survey agreement (i.e., 5-Strongly Disagree, 4-Somewhat Disagree). Similarly, a lower Mean Rank is interpreted as higher survey agreement (i.e., 1 – Strongly Agree, 2 – Somewhat Agree). Table 22 exhibits Mann Whitney U calculations for the single significant item on the Competency Scale of the Combined SIMS/PLS.

Table 22

Mann Whitney U Results – Significant Item on the Competency Scale

Combined SIMS/PLS Item	MS Mean Rank	CPS Mean Rank	U Statistic	*z* Score	Sig.[a,b]	Effect Size
One of my goals in school is to learn as much as I can.	63.56	51.43	1273.00	-1.962	**.050**	-.18

Note. a. The significance level is .050. b. Asymptotic significance is displayed.

Mann Whitney U calculations indicate CPS students (*Mean Rank* = 51.43) possess a personal goal to learn as much as they can in school to a greater level of agreement than MS participants (*Mean Rank* = 63.56) (i.e. 1-Strongly Agree, 2-Somewhat Agree, etc.) ($p = .50$, $p <$

.05) (Field, 2017). The researcher references the Reported Frequency to gain a clearer understand the nature of the difference between MS and CPS participants (Cohen et al., 2007). At a rate of 75% (33 out of 44) CPS participants have a goal in school to learn as much as possible. In comparison 59.5% (44 out of 74) of MS students agree to possess the goal of learning as much as possible in school.

Qualitative Results

Qualitative participant data from the MS and participating CPS was intended to shape a deeper understanding of how to interpret the findings of quantitative outcomes in the final comparison step of the research design (Creswell, 2012; Maxwell, 2013; Mertler, 2016). The researcher moderated semi-structured focus group sessions for representative groups for each school type, two MS groups and two CPS groups. Focus-group discussions require a systematic plan for audio recording and subsequent transcription (Cohen et al., 2007; Marshall & Rossman, 2016). The researcher used the embedded audio and visual recording feature of the video-conferencing platform, Zoom, to capture the discussion during each session (Zoom Video Communications, 2020). Recordings were delivered digitally to a transcriptionist. Participants were assigned a pseudonym to preserve anonymity, and final transcripts were sent digitally to the researcher (Creswell, 2012). Using a descriptive topical coding system the researcher worked to see common themes emerge (Bowen et al., 2017; Marshall & Rossman, 2016; Saldana, 2016).

Analysis involved a multiple reading process with a keen attentiveness to repetition and patterns (Creswell & Poth, 2018; Maxwell, 2013; Saldana, 2016). On the initial review, the researcher worked to gain a sense of the general message of individual participants by creating memos and pre-coding transcripts (Marshall & Rossman, 2016; Maxwell, 2013; Saldana, 2016). Topical coding is recognized as a scholarly process of transcript analysis (Bowen et al., 2017;

Gonzalez, 2016; Saldana, 2016; Thomas & Cooper, 2016). As repetition was recognized, reoccuring words and phrases such as “motivates me,” “choice,” “want,” or “grades” were highlighted and tallied. Words were organized by topic, such as “positive feelings on choice,” “personal interests/independence,” or “curriculum.” Concepts were categorized and placed on a color-coded list (Bowen et al., 2017; Marshall & Rossman, 2016; Maxwell, 2013; Saldana, 2016). Furthermore, unique expressions such as a description of students’ voice as “taken seriously” were marked (Marshall & Rossman, 2016).

Quantifying the qualitative data is common in mixed-methods studies to compare two groups of responses (Saldana, 2016). After topical coding and frequency counts, the researcher compiled a list of categories emerging within the separated school type transcript sets (Marshall & Rossman, 2016). Frequencies between the categories were compared to discover any relationships or variations between the level of perceived student agency amongst the MS students and the control group, CPS students. Categories recognized consistencies and contrasts between groups (Bowen et al., 2017; Maxwell, 2013). The researcher drafted a report to describe commentaries and display themes discovered through the coding process (Marshall & Rossman, 2016; Maxwell, 2013; Saldana, 2016).

Each of the respective MS and CPS qualitative session responses were transcribed into one data set. During the multiple iteration coding process, twenty-four codes were developed as frequently occurring topics of discussion. The items were arranged in descending order of incidence. Tables 22 and 23 provide a display of the frequent codes for both school types. The researcher ensured ample comparable coding occurred for the two sets of transcripts, as indicated by the total number of coded responses. The MS data resulted in 498 coded items, and the CPS

data resulted in 511 coded items. The calculated percentage of occurrences of coded comments reveals the proportion of the particular type of response in comparison to the whole.

Table 23

Chart of Frequency Codes Micro-Schools Focus Group Sessions

Frequent Codes for MS Qualitative Data	Frequency Of Codes	% of Total Coded Comments
School Environment/Structure	53	10.6
Assignment or Project Style	51	10.2
Technology	47	9.4
Positive Feelings on Choice	34	6.8
Peer Relationships/ Community	27	5.4
Individual Pacing	23	4.6
Positive Elements of School	23	4.6
Self-Reflection/Awareness	21	4.2
Voice/ Input/ Feedback	21	4.2
Social Emotional Support	18	3.6
Negative Elements of School	18	3.6
Personal Interests/ Independence	18	3.6
Personal Goals/Future/ Real life	17	3.4
Sense of Competency	17	3.4
Teacher Role	15	3
Teacher/Student Relationships	13	2.6
Intrinsic Motivation	12	2.4
Learning Purpose/Value	12	2.4
Public vs. Private School	12	2.4
Curriculum	11	2.2
Extrinsic Motivation	11	2.2
Comparison of Personal Progress	8	1.6
Negative Feelings on Choice	8	1.6
Student Role	8	1.6
Total	498	

Table 24

Chart of Frequency Codes Conventional Private Schools Focus Group Sessions

Frequent Codes for CPS Qualitative Data	Frequency Of Codes	% of Total Coded Comments
Technology	54	10.6
Positive Feelings on Choice	42	8.2
Student Role	35	6.8
Negative Elements of School	33	6.5
Extrinsic Motivation	32	6.3
Peer Relationships/ Community	31	6.1
Positive Elements of School	31	6.1
Individual Pacing	26	5.1
Teacher/Student Relationships	22	4.3
Curriculum	20	3.9
Intrinsic Motivation	20	3.9
Sense of Competency	20	3.9
Learning Purpose/Value	19	3.7
Teacher Role	19	3.7
Assignment or Project Completion	18	3.5
Self-Reflection/Awareness	18	3.5
Comparison of Personal Progress	15	2.9
Public vs. Private School	14	2.7
Voice/ Input/ Feedback	12	2.3
Negative Feelings on Choice	11	2.2
Social Emotional Support	9	1.8
School Environment/Structure	6	1.2
Personal Interests/ Independence	3	0.01
Personal Goals/Future	1	0.01
Total	511	

Introduction of constructed clusters. After the initial discovery of twenty-four codes, the researcher determined six clusters representing key findings from the transcripts relaying middle grade students' perceptions of motivation, choice, and competency (Marshall & Rossman, 2016; Saldana, 2016). Through the memos, reoccurring words or topics, and unique commentary, the manual coding process resulted in emerging themes (Saldana, 2016). Table 25 identifies thematic clusters as Program Elements, Relationships, Personal Competency, Choice, Motivation, and Impact of Environment. Nested within each cluster are two to six of the originally coded topics. Total counts for themes are displayed and proportion of commentary compared to total coded comments. Constructing clustered groups of topics allows the researcher to compare frequency and magnitude of the responses across groups and move to a consolidated meaning (Saldana, 2016).

Table 25

Organization and Tallies of Constructed Thematic Clusters Focus Group Commentary

	Micro-School Commentary	Conventional Private School Commentary
	Percentages represent proportion of commentary per group, related to Thematic Cluster	
Program Elements Total	124	111
• Technology • Curriculum • Teacher Role • Assignment or Project Style	.25	.217
Relationships Total	40	53
• Peer Relationships/ Community • Teacher/Student Relationships	.08	.104
Personal Competency Total	98	119

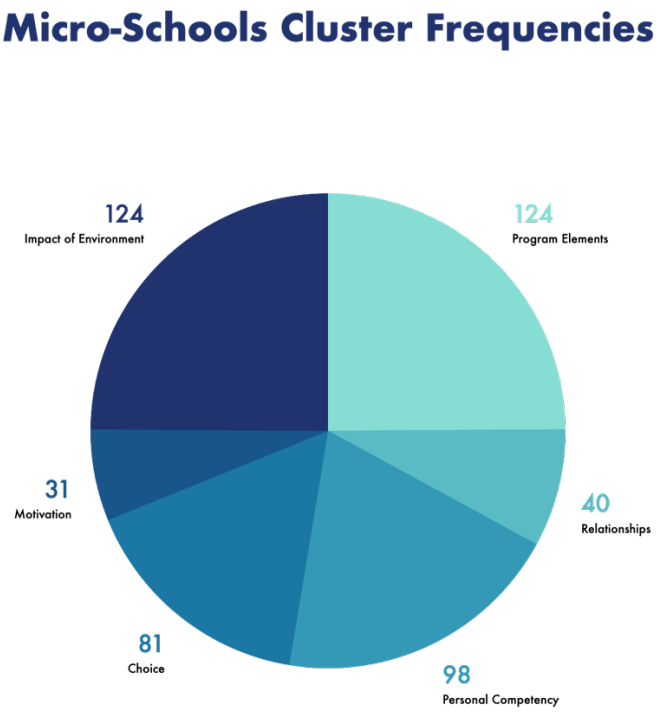
• Student Role • Individual Pacing • Sense of Competency • Learning Purpose/Value • Self-Reflection/Awareness • Personal Goals/Future	.197	.232
Choice Total	81	68
• Positive Feelings on Choice • Voice/ Input/ Feedback • Negative Feelings on Choice • Personal Interests/ Independence	.162	.133
Motivation Total	31	67
• Extrinsic Motivation • Intrinsic Motivation • Comparison of Personal Progress	.062	.131
Impact of Environment Total	124	93
• School Environment/Structure • Positive Elements of School • Social Emotional Support • Negative Elements of School • Public vs. Private School	.25	.182

Micro-Schools Clusters

Frequency of micro-schools constructed thematic clusters. Visual tools are used to communicate outcomes in mixed-methods research (Murawska & Walker, 2017). Figure 5 presents the frequency of the clustered themes discovered in the MS transcripts from semi-structured focus groups. On initial observation, the largest portions of the MS clusters are Impact of Environment and Program Elements. The two categories represent 50% of the responses by MS participants. For MS, Personal Competency ranks third, representing 19.7% of the commentary. The fourth category is Choice, including 16% of the comments. Fifth ranking is Relationships at 8% and lastly Motivation, representing 6.2% of the MS commentary.

Figure 5

Cluster Frequencies for Micro-schools Transcripts



Impact of environment. Comments on the manner in which the MS environment affects learning occurred 124 times, representing nearly 25% of the total coded commentary. MS students perceive a "meaningful" school environment with "support" for students to "be great learners" with a "focus on character development." Students described the MS setting as "safe," a "special place," "encouraging," and "effective." An eighth grader reflected on the ability to "control how I learn in my learning experience," while another student commented the school made her "feel like I can say anything" and "helps me … get really organized." One eighth grader stated how MS learners are "taught to be curious and engaged in your work, in your society." Students recognize the school is "social," "open," and "appeal[s] to a … specific demographic." The school "learning experience has stayed the same even through quarantine, which really says a lot" noted an eighth grader. The MS students shared about opportunities for

involvement to “make the best choices for themselves,” and one stated “feedback … [is] really important for a learning environment.” Another participant described the school as a “student led school.” In describing prior school environments, a MS student felt “it was just go to lesson, learn that thing, do test, forget everything that you just learned.” “Transfer[ing]” to the MS environment was “a really big change” for one student, referring to thoughts about a prior school. After coming to the MS, she “learned [I] wasn’t actually learning, it was more just forcing information into my head.” Learners in the MS convey a perception of “such a strong understanding of questioning things and being intrinsically motivated that it really sets them up for a lot of success.”

Program elements. The focus group participants were well aware of individual school program elements within the MS setting. Program Elements commentary comprised 25% of the coded focus-group items, mentioning programs such as “curiosity times” and “field experiences.” The MS was described as an “independent learning-based school.” Also, referenced was the term “learning level” as the MS student’s academic progress is experienced as “different levels, kind of, so to kind of separate by learning level, not really by too much of age level.” Reflecting on structural differences, students stated MS systems “do less of grade dividing.” Set up for personalization, students describe having “space for reflection,” paired with the thought, “you don’t have to worry about deadlines.” One student reported, “you don’t have to do one thing like exactly at a specific time.” Phrases such as “super personalized” and “personalized to you” described the perceived MS experience. Specifically, a learner commented, “they understand how I learn and how I communicate with people.” Additionally, a student relayed a perception of the MS as “teaching through what students are passionate about.” From the student standpoint, the MS works to “create curriculum that mirrors what we are

interested in." Other MS students gave examples of learning activities.

- "designing an exhibit,"
- "presentation,"
- "hands-on,"
- "food drive,"
- "getting outside,"
- "write a paper,"
- "virtual labs," and
- "research"

Learners felt "support from their teachers" who help MS students "talk through" "real-life" issues. A student relayed a sense of support during distance learning and shared,

> I definitely do think [school name] has helped our community during this time to kind of just say that we're in a really tough time, but we still want to help our students, we still want our students to be great learners and graduate…

In sum a student stated, "all the teachers … want to help kids."

Relationships. The focus group transcripts from the MS participants included remarks on school level relationships 8% of the time. Students reflected on the MS setting with statements such as, "[we] spend … a lot of time together," sense they "belong," and can "communicate with how [they] feel about each other." Learners describe the "community" as "social," "open," and a "giant family." MS learners perceived interactions with teachers to "more guide us on our learning journey instead of telling us what to do." One student stated, "our teachers have learned how to teach us." Common relational comments included:

- "we're all learning as a group,"

- “we have our whole community to reach out to,”
- “[we] learn with each other,”
- “we can ask a buddy,”
- “being able to help other people,” and
- “you can ask anyone for help.”

Students also reflected “teachers seem to really care,” continuing, “[it] feels like you’re engaging with your teachers as colleagues,” with students feeling “a lot of support from their teachers.” One middle school boy remarked the teacher “never made me feel stupid.” A seventh grader stated, “I can try anything and they [the teachers] can just help through whatever I’m doing.” Not every student reported positive connections. One eighth grader commented, “not seeing your school reflect who you are as a person can be really limiting.” Other students reported at times some peers “fight.” However, the adult “guides” lead a “peace table” process to bring “forgiveness.”

Personal competency. During the course of the focus groups, comments on personal competency occurred 98 times, representing 19.7% of the total coded commentary. Middle grade students stated, “if you prove that you’re intrinsically motivated, then you should be able to challenge yourself.” The MS students mentioned being “self-paced” and doing “self-based work.” Learners expressed additional remarks on ownership.

- “personal leader of your own learning,”
- having a “strong understanding of questioning things,” and
- “teaching your teachers as much as your teachers are teaching you.”

When discussing difficult academic challenges, students reflected ownership as well, “[the problem was] probably part my fault too,” and “it’s really powerful to … encourage students to

figure it out themselves." Students were aware of personal strengths and spoke of the opportunity to do what was described as "intense independent work." One MS student explained, "essentially, you don't feel like you're learning basic things because you're doing it through a lens that you're really excited about." Another student remarked "the way I learn may be different" and it may be "better just writing it out on paper." One MS girl commented she is "better with physical things." MS students commented on a sense, "we all learn in a different way" and "the way I learn may be different than most people learn." One seventh grader was excited the school "test[ed] me on how I learn." Descriptions of self-awareness included, "understanding self and reflecting on growth," and "students clearly understand how their mind works." In regard to technology in the learning space, students described, "I've learned better about technology and it helps me a lot," "[technology] really helped me form more of a schedule." MS students reported the purpose of technology in the learning environment, "I can go deeper," "I can definitely learn more about a topic," and "we can do that virtually, so we don't have people messing around." When asked about negative elements of educational technology, one student responded, "technology negatively affects kids' brains," and students should be "wary of how addicting it can be." A final comment on personal competency, one MS student exclaimed, "I'm not afraid to really do anything," and, "I feel like I'm going to be a better adult when it comes to what I feel like is great for the world just through this school."

Choice. The topic of student choice comprised 16.3% of the coded remarks. The 81 comments included statements such as, "students can do, can decide for themselves," "make their own choices," and, "academic flexibility." MS learners reported being "encouraged to engage in independent study." One MS student expressed, "I think that self-paced learning should be seen as a privilege." The learners expressed feelings surrounding the concept of

student choice such as, “empowering,” “seen,” “valid,” “being taken seriously,” and “I’m important.” Regarding curriculum, MS students shared, “you don’t have to learn one specific thing,” “you actually have control,” and “you should be able to … engage in your passions.” In the student-centered environment, the participants reported, “[we have] almost full control about what we want to learn,” “we get to make up the rules and the structure,” “tell our teachers and our guides what we want to learn about and sometimes give them feedback.” Students even reflected on the choice of selecting the “school mascot” as something “students decided a while ago.” For individual assignments, students describe the experience of choice as having “several options to do the same thing” or “being able to choose what you learn.” “Self-pacing” was also seen by MS participants as an element of choice. Learners described pacing in the MS context as, “you could do it any time you want,” “work on your own pace sometimes,” and, “you can take your time.” Broader than an individual assignment, one boy described an element of choice as, “choose that path you want to go down.” Limitations to choice were also perceived. Students viewed teachers as allowed to “make up the ground rules” in order to keep students “safe.” Another student’s comments focused on the transition into the MS the previous year, sharing, “I think that having a choice doesn’t work well for me … I felt like I chose the wrong things.”

Motivation. Motivation was the least explored topic in the MS groups, resulting in 31 coded comments or 6.2% of the total. The discussion presented MS perceptions of “intrinsic motivation” and “outward motivation.” MS middle grade participants indicated motivation came from being taught to “question things,” “ask questions,” “be curious,” and “the feeling of accomplishment of getting the work done.” MS focus group students voiced motivation came from earning “points,” using a “tracker,” “trying to get a certain number of points each week,” and “sometimes I get my motivation from other sources” like “parents” or “having a reward at

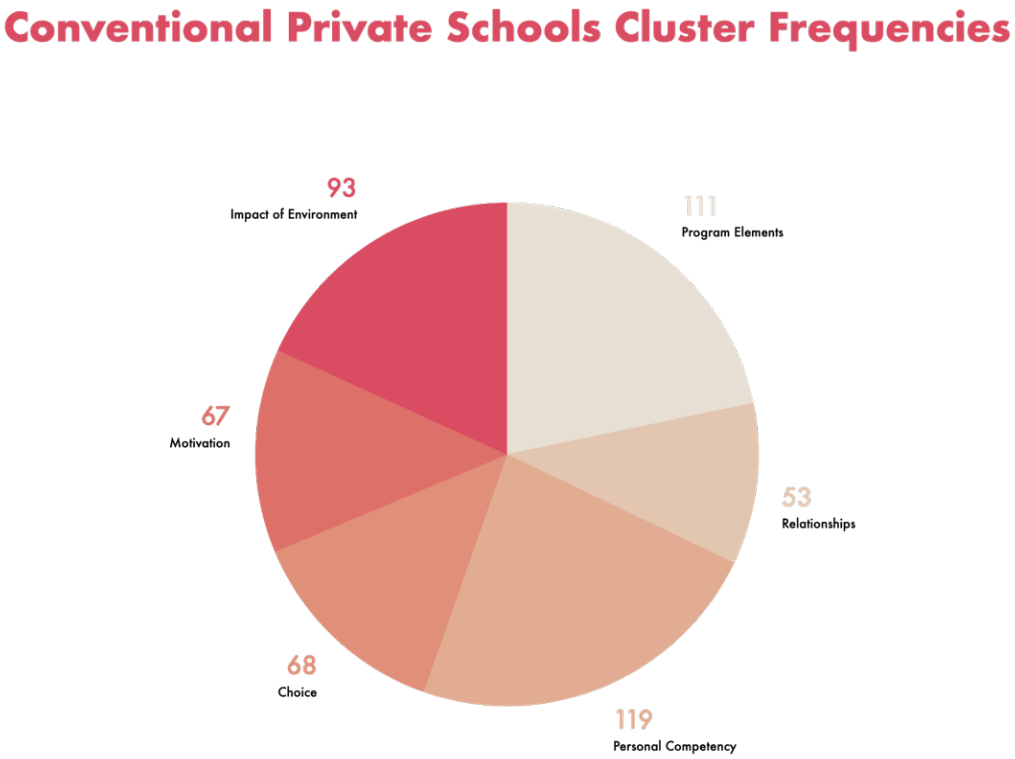
the end." Describing peers, a MS learner reported, "some of the kids are super motivated and they will, they'll speed through everything." A student remarked, "being able to choose what you learn helps." When asked what parts of school were motivating, students responded with statements related to time restraints: "[I can] spend as much time as I need on that specific topic" a boy commented. Still another stated motivation came when "no pressure to answer quickly" existed, "you could take your time," and "you don't have to worry about deadlines and stuff." Another student shared, "intrinsic motivation tends to be a lot more powerful and meaningful." The topic of "passion" and "challenge" assisted learners to "engage in what you're excited about," and it was described as "more motivating because your work is meaningful." Students described demotivating activities as "arguing in some way," "some fights that happen," and "being behind in math." MS participants perceived motivation when "what you're doing is making an impact on society" and "you're not doing what you don't want to do."

Conventional Private Schools Clusters

Frequency of conventional private schools constructed thematic clusters. Figure 6 is a pie chart identifying quantity of CPS participant comments for each of the six themes. The largest portion of CPS commentary fell in the category of Personal Competency at 23%. Secondly, Program Elements comprised 21.7% of the CPS comments. The CPS data indicates Impact of Environment as the third ranking theme, occurring at a rate of 18.3% in the coded qualitative focus group transcripts. The fourth most frequently coded theme was Choice at 13.3%. Fifth was the theme of Motivation, with 13.1 %. Ranking sixth, Relationships comprised 10.4% of the total comments.

Figure 6

Cluster Frequencies for Conventional Private Schools Transcripts



Impact of environment. CPS middle grade participants commented on the impact of the learning environment 93 times, making up 18.2 % of the coded items for the group. Students label the environment as "very rare," "Christian," and "Christ-centered." The participating CPS students described "the school [as] a better place" compared to "my old school." Further, the students identified "peace and patience" within the CPS environment. A sixth grader relayed the school "shows us how to be kind to younger students." Students commented on how the CPS program "builds character" and students "talk about stuff we should do for the school." Describing teachers, the students expressed "they have God's grace," "[are]flexible," "really nice," and "help." A CPS learner described teachers "ask you all the time [if you're struggling]

and they want to actually help and strive to be better." Other descriptions of the environment highlighted CPS peers and included voiced reflections of "care," "kindness," "fun," "rare," "nice," and "small." One student stated, "it's good that we have some, I don't know how to really say it, like discipline in school." A middle grade learner mentioned a "water fight" and "noodle tag" while discussing the element of "fun" at school. Students perceived, "the right amount of freedom" and "fun learning games" were part of the "really special" school environment. A student reported the school environment gave opportunities to "have fun while we are doing school."

Program elements. Program Elements was the second most frequent theme discussed in the CPS focus groups. Comments which numbered 111, represented 21.7% of the total coded remarks. Students shared the "school teaches us what we know" and "how to learn." During the focus groups CPS students gave examples of school routines included throughout the student day. Learners described, "teachers put your grades into a gradebook" and "there's a schedule for you." Student told of "assignment" types such as "Powerpoints," "drawing," "group project[s]," and "write papers." The students "learn the necessities" in classes.

- **"**math",
- "history,"
- "reading,"
- "music,"
- "art,"
- "electives," and
- "leadership class."

Students reported the ability to use "ipads" or "computers" and listed "good quality

apps.” Applications mentioned included, “Safari and Wikipedia,” “Google docs,” “Zoom,” “Schoology,” “RenWeb,” “MobyMax,” and “Adobe Draw.” CPS students mention they “like technology” in the learning space as it “gives us … access to Kahoot” and is used to “turn in assignments and post a picture of them.” CPS students shared technology was used to access “little videos… you can watch for your assignments” or “we can search stuff on Safari.” Students remarked technology also provided “an advantage of getting it [work] done quicker.” One CPS student remarked “kids might get distracted from school assignments with some [video] games on it [iPad].” Another learner admitted, “sometimes too, I can get distracted when I’m on the iPad.” A fifth grade CPS student shared, “You can accidentally type in the wrong thing and might be an inappropriate thing.” Students reported technology use for “Zoom so you can talk to your teachers” and “ways to email your teachers.” A CPS student described, “when I am on screens, I get really, really tired,” another stated technology may cause “hurting eyes.” A student remarked “sometimes technology doesn’t work,” and students “just waste your time trying to fix the broken computer.” One student “like[s] that they give us individual things so we don’t have to work at the same pace.” Teachers were identified as “supportive” and “she [the teacher] comes up to us and explains the whole thing.” Another CPS learner continues “[the teacher] finds new ways to help us.”

Relationships. Remarks related to relationships totaled 53, or 10.4% of the coded comments. In the CPS focus group discussions, words such as “friendships,” and “friends” were mentioned several times. One learner shared, “friends wouldn’t judge us.” Students described the CPS environment as a “community” and “everyone is nice to each other.” “I’m very grateful for my other classmates,” a CPS learner explained. Students stated they felt “open with our teachers.” One student said he “feel[s] this connection through Christ with our teachers,” and

students “could talk to them about our problems.” Furthermore, a CPS student described, “they [teachers] engage with their students” and “really care … about the students.” The CPS focus group described teachers as “very, very supportive” and “very, very flexible.” One commenting, “Teachers want us to … have a good grade.” Students “like it” when “other people participate.” Speaking of participating in school activities a CPS student expressed not wanting “to be left out.”. A student shared, “[we can] communicate with each other now that we’re on the iPads.” Finally, a participant stated, “the people you know and trust are at this school.”

Personal competency. Personal Competency was mentioned more often than other themes in the CPS groups. The category included 119 or 23.3% of the coded CPS comments. The CPS focus group felt learners should “challenge yourself to see how well you do” and described “we don’t have to work at the same pace as other people in our classroom.” As an example of working independently a learner shared, “in our history class, we read a section of a book and then our teacher gives us three different assessment thingies to do. And they’re like you can work at your own pace instead of working really fast when we’re in class.” Another commented a CPS teacher “applied a lot of math we’ve learned recently to our lives” and helped him “understand why it’s actually important.” With the help of “technology,” students recognized the ability to “go on[line] … and check the instructions” in a situation when “you weren’t paying much attention, so you missed it.” One student shared, “I can look it up and research it” and dig “deeper and deeper” with “iPads.” CPS participants reiterated the concept of “use[ing] what we learn to get the answers right.” “The school teaches us what we know” and “how to learn” a CPS middle grade student shared. A CPS learner remarked school “helps me connect this to my life and it helps me remember the content.” Another student commented the school was “helping me manage whatever I do more efficiently.” Personal and individual

comparisons were made as CPS students reflected together, “other people turn it in faster,” or “[I] feel like I’m slow.” Middle grade students perceived, “everybody’s different from me” and “I am different.” Students mentioned phrases and terms such as “self-doubt,” “unmotivating,” “tried so hard,” and “I am at the lowest one … in my class.” One CPS sixth grade learner described personal achievement as “moving up and leveling up” and “a chart to see” progress. “If you got a good grade, you can be proud of yourself,” one boy commented. CPS students collectively expressed a need to learn “how to persevere in our homework.”

Choice. Concepts related to student choice were identified 68 times in the focus group discussions, representing 13.3% of the total coded comments. CPS student commentary such as “nice to feel like they [teachers] trust us,” “really cool,” “glad,” or “responsible” emerged. A learner commented on feelings associated with having choice, “Well, it feels good adults aren’t just saying oh, what we need to do and that we actually have a say in what we are going to have to do eventually.” “[Choices] allow us to kind of have an idea” and “you can choose how.” When given the opportunity to choose, CPS students use descriptive feelings of “creative freedom” and “creativity.” “I can show them how creative I am,” a learner interjected. Another learner proposed choice “helps me be a better learner.” A CPS sixth grader understood choice as making the work “unique from someone else’s.” A number of students felt there was “just the right amount of choice” in the CPS environment. Other CPS learners felt there was “too little choice”. The remarks being, “I feel like I can’t do the work that they’re asking us to in the time period they want us to,” and “[the work] has to be turned in at the end of class” indicated a sense of “stress.” Students deemed no choice as “boring” and “[lessons] are a little on the boring side.” One student going further, implying if a lesson did not include choice “[the teacher] does not try to intrigue you.” One student suggested allowing students to “be in charge” may result in peers

"do[ing] whatever we want." CPS students concluded "[it is] very important for children to have a choice."

Motivation. Middle grade students in CPS remarked 67 times, or 13.1% of the coded comments on Motivation. The CPS participants remarked multiple times on the motivating element of earning "good grades," and "good report cards," and "try[ing] to improve your grades." The "grade system" was the predominant method reported to motivate students in the CPS commentary. One middle school boy responded in regard to grades, "you kind of want to get a good grade because, well, it's an important thing because if you can't move on in life, then what are you doing?" To view grades CPS students reported the ability to "see how you do right after" or student may "go onto the app and see what you got." CPS students report "it really does motivate me" when the teachers gave opportunities for students to "try to improve your grade," "try to redo it," or "improve your grade," "redo our assignments and make a better grade," and "so we can have a good grade." Beyond grades, CPS students shared other extrinsic motivation:

- "points and stuff,"
- "prizes,"
- "chips,"
- "candy,"
- "toys,"
- "classroom dollars," and
- "extra points on a test."

Intrinsic motivation was described as "when the things that we're doing in class are interesting." Participants reflected on past lessons "intriguing or entertaining" were more "fun" and "motivating." CPS student responses such as "do the game in class and it's pretty fun," and if

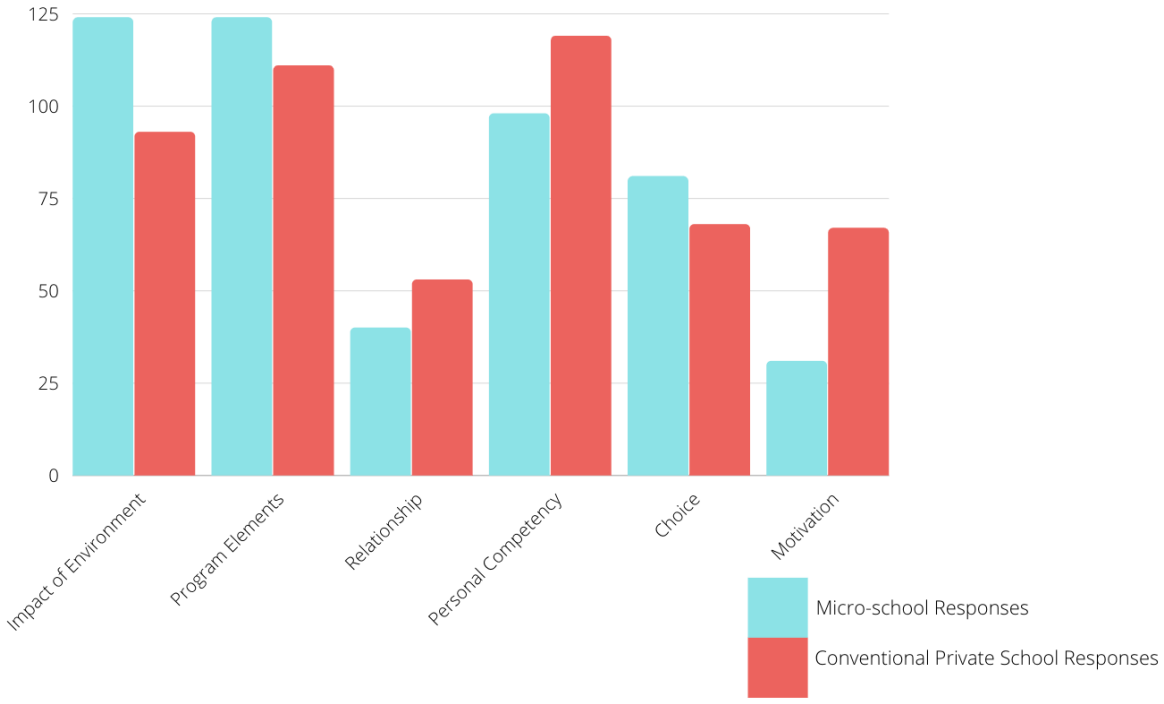
lessons were “fun then you want to do it” were discussed. Demotivating factors discussed by students included, “just staring at a textbook,” “[teachers being] a little pushy,” and “might not give enough time” for assignments. Participants mentioned “stress” and “pressure” as additional demotivators.

Qualitative Data Comparison.

The comparative element of the study involved contrasting the focus group results of two types of school environments (Creswell & Creswell, 2018; Fink, 2003; Maxwell, 2013). Findings from the qualitative focus groups resulted in six themes. Figure 7 identifies the frequencies and proportion of commentary on each theme by school type. The Impact of Environment was mentioned 124 times in MS focus group sessions, and 93 times by CPS participants. The greatest similarity between the groups in one theme was Program Elements. Program Elements were also mentioned 124 times by MS group members and 111 by CPS students. Comments referring to Relationships came up 40 times in MS discussions and 53 times with CPS students. The greatest difference between groups was revealed in the theme of Motivation. Motivation was also the least directly mentioned MS theme at 31 occurrences, and for CPS students, 67 times. Choice had a greater number of comments by MS students with 81 mentions, and CPS students commented on choice 68 times. Lastly, Personal Competency was mentioned frequently by both school type focus groups, MS students with 98 comments, and CPS with 119.

Figure 7

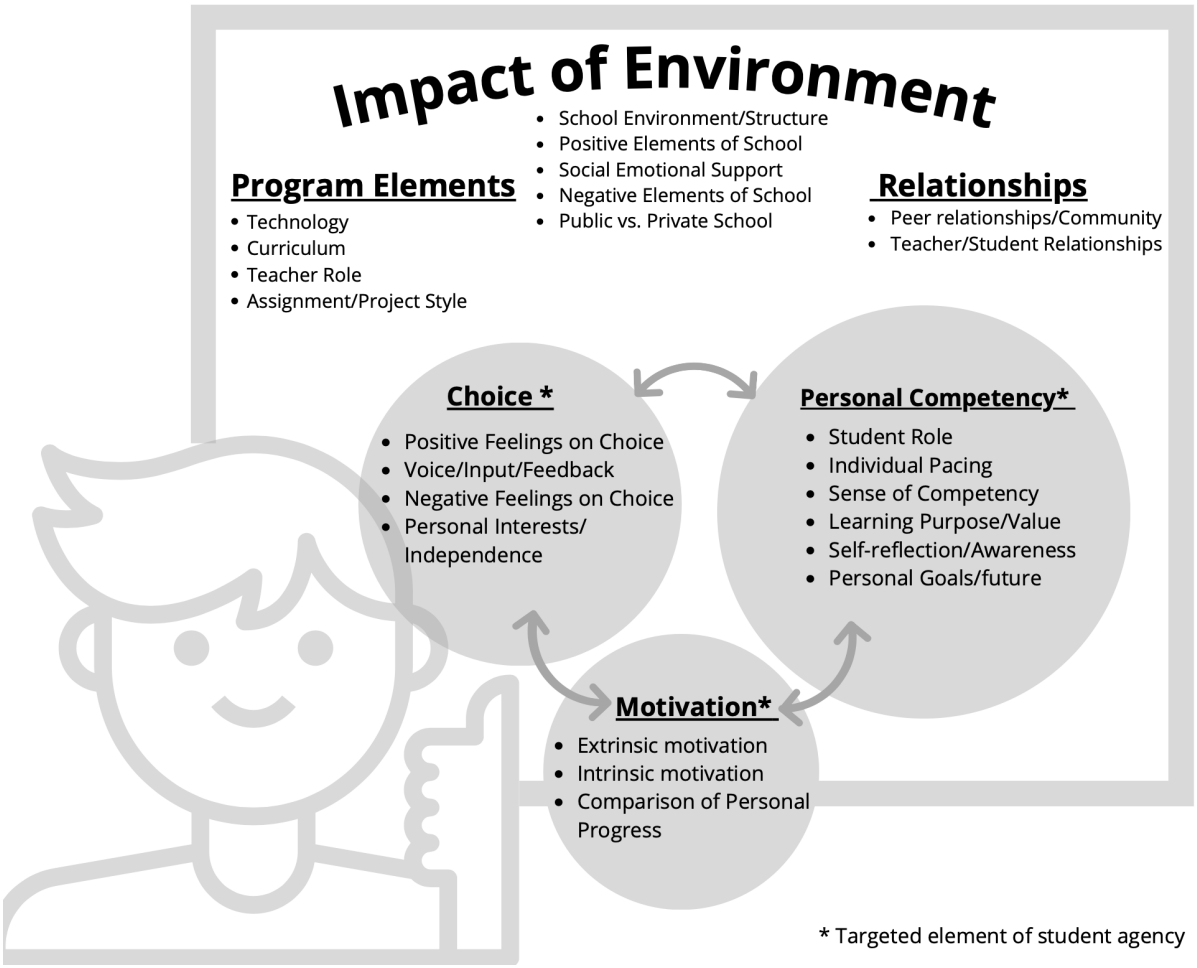
Comparison of Themes by School Type



The umbrella of the Impact of Environment includes two subheadings of Program Elements and Relationships. Defined separately and intertwined within the environment were themes of Personal Competency, Choice, and Motivation. Figure 8 lays out the categories included within each of the themes. The figure illustrates the embedded nature of the elements of student agency revealed in the analysis of the qualitative data.

Figure 8

Umbrella of Impact of Environment with Categories and Clusters



Conclusion

Chapter IV offered an explanation of the methodology, participants, site descriptions, gathered quantitative and qualitative data, and a presentation of the analysis of data to address each research question in the study. This study used a comparative mixed-methods strategy to determine the perception of participants on the extent to which three subcategories of student agency are effectual in modern MS classrooms (Creswell & Guetterman, 2019). The explanatory sequential design approach required the researcher to intentionally weave the quantitative and

qualitative elements of the study into a cohesive plan (Ackley, 2019; Bowen et al., 2017; Creswell & Creswell, 2018; Murawska & Walker, 2017; Wong & Cooper, 2016). A quantitative survey instrument, the Combined SIMS/PLS provided data for statistical analysis of student perceptions. The survey was made up of three scales, one to address each of the three research questions. The resulting data was presented on frequency charts, arranged by the scales on the Combined SIMS/PLS. A Mann Whitney U analysis revealed five statistically significant comparisons of MS responses to CPS responses. The second phase of the study involved qualitative focus-group sessions. Qualitative focus group transcripts were coded. Six themes emerged from the data including Impact of Environment, Program Elements, Relationships, Personal Competency, Choice, and Motivation. A discussion was provided for each theme within the MS sessions and then, again, discussions were provided for the CPS sessions. Initial survey data from both the MS and CSP group as well as qualitative data from nested focus groups was compared and initial notable items presented. Chapter V will further explore the results, findings, and ramifications of data and analysis presented above.

Chapter V

Discussion

Introduction

The United States educational system has engaged in cycles of reform for two centuries (Rury, 2013; Sass, 2012; Tyack & Cuban, 1995). From in-home schools, private tutors, and pioneer one-room schoolhouses, to structured public schools based on an industrial model, Americans have consistently valued education for the rising generation (Adams et al., 1941; Crischelle, 2020; Kramer, 2018; Sass, 2019). Educational reform, once driven by preferences of parents and the local community, is now advanced by elected officials as well as successful private business philanthropists, social commentators, and innovative edu-treprenuers (Cohen, 2017; DeArmond & Maas, 2018; Pedersen, 2012; Sass, 2021; Tarbutton, 2018; Tyack & Cuban, 1995; Vinovskis, 2015; Williamson, 2018). While core academics remain a meaningful pursuit for 21st-century learners, the development of the non-cognitive domain is rising to the forefront as a necessary skillset (Bjorklund-Young, 2016; Egalite et al., 2016; Hoeschler et al., 2018; Tarbutton, 2018).

Urie Bronfenbrenner's Bio-ecological model places the developing human at the center of a map of nested circles of influence (see Figure 1) (Brendtro, 2006; Bronfenbrenner, 1977, 1979; Bronfenbrenner & Evans, 2000; Onwuegbuzie et al., 2013; Wertsch, 2005). Thrust into rapidly progressing physical, emotional, and often social circumstances, literature speaks to the instability of the middle grade years (Bishop & Harrison, 2021; Sørlie et al., 2020; Starks et al., 2018; Wolff et al., 2020). Members of Generation Z and Generation Alpha are cast as learners in a tech-saturated age and are maturing intellectually, emotionally, relationally, and spiritually

(Cho & Littenberg-Tobias, 2016; Jha, 2020; McCrindle, 2020; Oriol et al., 2017; Rheingold & Seaman, 2017; Washington, 2021).

MSs, small institutions with limited student body populations, a student-centered philosophy, open learning spaces, a focus on innovative strategies, and integration of personalized learning, focus on developing student agency (Artz, 2018; Crischelle, 2020; Horn, 2016; Kramer, 2018; Linaberger, 2018; Prothero, 2016; Rivera, 2016; Sandefer, 2018; Templeton Academy, 2018). Student agency, the capability and ownership an individual possesses to act on behalf of ones learning goals and needs, is integral to the 21st-century learner skillset (Akos, 2004; Avery et al., 2021; Hitlin & Elder, 2017; Luo et al., 2019; Mameli et al., 2019; Poon, 2018; Reeve & Tseng, 2011; Richardson, 2019; Zeiser et al., 2018). The MS model is understudied, in existence only since the early 2000s (Horn, 2016; Prothero, 2016). MSs enroll students of multiple ages, however, due to the fragility of the middle grades' developmental stage, exploring the perceived effect of the learning environment on the age-group may provide meaningful information for educational researchers in a landscape rich in innovative school reform.

Three research questions guide the exploratory process:

1. How does the micro-school learning environment impact a middle grade student's perception of student agency in regard to a sense of motivation?
2. How does the micro-school learning environment impact a middle grade student's perception of student agency in regard to a sense of choice?
3. In what ways does the micro-school learning environment's use of a personalized learning platform impact student agency in regard to a middle grade student's sense of competency?

Chapter V presents an interpretation of the results of both quantitative and qualitative phases of the study. Discussion of interpretations of survey results and focus-group findings are organized by research question and include suggestions for relationships to current literature and student comparisons across two school types. The theoretical framework is woven throughout as a backdrop to the discussion. The chapter includes recommendations for further research and is finalized with implications for professional practice.

Summary of Results

The purpose of this study is to examine the impact of the unique MS environment on the development of student agency in regard to motivation, choice, and competency for middle grade students (Mameli et al., 2019; O'Neill, 2015; Oluwatayo et al., 2016; Wolff et al., 2020; Wall et al., 2018). The researcher utilized explanatory sequential design as a guided step-by-step path to discover perspectives of middle grade students attending both MSs and CPSs (Bowen et al., 2017; Creswell, 2012; Creswell & Guetterman, 2019; Maxwell, 2013; Wong & Cooper, 2016). The mixed-method format relied on a fixed protocol yet allowed for a measure of flexibility in the secondary, qualitative section (Maxwell, 2013). The purpose of the initial quantitative data collection step was to provide a baseline of information to inform the design of the qualitative step (Creswell & Guetterman, 2019; Onwuegbuzie & Collins, 2007). In the first phase, the Combined SIMS/PLS instrument collected student perception on three scales, motivation, choice, and competency (Brooks & Young, 2011; Currie, 2018; Guay et al., 2000; Pane et al., 2015). Four semi-structured focus groups served to deepen the examination of middle grade student perceptions, during the second, qualitative, phase of the study (Creswell, 2012; Onwuegbuzie & Collins, 2007). The study involved a comparative element between MS and CPS participants in both quantitative and qualitative phases. Both participant groups attended

private schools, enabling a focus on the impact of the school climate, as literature shows parents participating in school choice programs tend to be from a similar family socio-economic status (Potterton, 2020; Rodgers, 2014). The results of each phase were compared to examine the differences and similarities between the potential environmental impacts on a baseline group of CPS students and students enrolled in a MS (Maxwell, 2013).

The survey was distributed to a total of 119 middle grade participants attending three MSs and two CPSs in the fall semester of 2020. The MS students comprised 75 members of the group and the remaining 44 participants were enrolled in a CPS. The blended Combined SIMS/PLS instrument (see Appendix F) used Likert-scaled prompts from the SIMS and the Personalized Learning Student Survey to gather information on the three sub-scales: motivation, choice, and competency (Guay et al., 2000; Pane et al., 2015). The Combined SIMS/PLS survey covered student perception of motivation with prompts eliciting why a student completes coursework and attitudes or feelings a student has towards completing work. The second sub-scale of the Combined SIMS/PLS, the Choice Scale, collected data on participants' sense of opportunity for choice, the type and frequency of choice, a perceived comparison to other learners, and how the individual may act when options are given. Finally, for the topic of competency, the Competency Scale examined school elements students perceived as important, a mindset of mental toughness, and personal belief about one's own ability to learn.

Quantitative findings were analyzed using IBM SPSS software, version 27 (Creswell & Creswell, 2018). The 39-item Combined SIMS/PLS results were initially examined for frequencies, followed by a Mann Whitney U test, for each sub-scale. The Mann Whitney U test was run on the three scales of the Combined SIMS/PLS to compare MS and CPS group outcomes. With a threshold of $p = .05$, 5 of the 32 survey items marked as showing significant

differences across participating groups. The statistically differentiated items were spread across the sub-scales, 3 on the Motivation Scale, 1 on the Choice Scale, and another 1 the Competency Scale. A Reported Frequency significance level of .75, representing a percentage of valid responses Strongly Agree or Somewhat Agree, was established by the researcher. For MS groups, 31.3% or 10 of the 32 prompts, reached the significance range, indicating points deserving closer examination. The significant items for MS responses were spread across the three scales, with the majority falling within the Competency Scale: two on the Motivation Scale, two on the Choice Scale, and six on the Competency Scale. For CPS participants, 53.1%, or 17 of the 32 items, across the scales reached the .75 significance threshold, 10 of the 14 prompts on the Competency Scale, 4 of the 7 on the Motivation Scale, and 3 of the 11 on the Choice Scale.

Guided by explanatory sequential design, semi-structured focus groups provided qualitative data to further examine student perceptions of agency (Bowen et al., 2017; Creswell, 2012; Creswell & Guetterman, 2019; Maxwell, 2013; Wong & Cooper, 2016). The four qualitative semi-structured focus group sessions included a total of 19 middle grade students previously involved in the quantitative phase of the study (see Table 6). The group sessions were each hosted on Zoom (2020), a video-conference platform. Sessions lasted 30 – 40 minutes. After introductions, the researcher asked students to share what "makes their school special." Following this opening, the moderator moved the conversation through an established protocol (see Appendix F) to examine student perception of the learning environment in regard to motivating factors, elements of and attitudes toward choice, and the level of competency in an environment with ICT personalized learning opportunities.

An inductive analysis included organization, description, and interpretation of data to provide an exploration of student perceptions (Mertler, 2016; Saldana, 2016). Qualitative transcripts were coded using a topical coding system (Bowen et al., 2017; Gonzales, 2016; Saldana, 2016; Thomas & Cooper, 2016). The researcher completed multiple full-length close reads of each transcript as well as re-reads of individual remarks. Individually tallied comments totaled 498 in the MS transcripts and 511 in the CPS transcripts. The comments were categorized into 24 topics (see Tables 22 and 23). Additionally, categories were organized into themes (Saldana, 2016). Six themes emerged and were described as Impact of Environment, Program Elements, Relationship, Personal Competency, Choice, and Motivation (see Figure 8). A combined exploration of phase one quantitative statistical outcomes, phase two qualitative themes, and the theoretical framework, provide insight into the impact of the MS environment on middle grade learners' sense of agency.

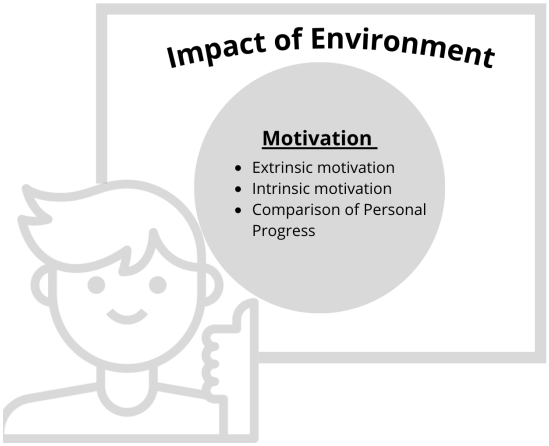
Research Question 1: Sense of Motivation, Summary of Results

The examination of student agency begins with the question, "How does the micro-school learning environment impact a middle grade student's perception of student agency in regard to a sense of motivation?" The Bio-ecological Model places the school at the center, the greatest influence on a developing mind of a child (Bronfenbrenner, 1977). Motivation is affected by learning environment factors including teacher-student relationships, peer relationships, rewards, meaningfulness of schoolwork, the level of choice in learning activities, and emotional safety (Guay et al., 2000; Jacobi, 2018; Kiefer et al., 2015; Rheingold & Seaman, 2017). The theme of the Impact of Environment (see Figure 9) may be viewed as an umbrella over the synergistic elements of student agency, including Motivation (Poon, 2018). While impossible to remove completely the element of motivation from the complex interplay of the

learning environment, Figure 9 presents topics represented as existing within the theme of Motivation from the qualitative constructed clusters (Brendtro, 2006; Bronfenrenner, 1977; Bronfenbrenner & Ceci, 1994).

Figure 9

Impact of Environment – Theme Highlight: Motivation



Intrinsic motivation is a desire to be competent coming from within an individual (Brooks & Young, 2011; Reeve et al., 2003). Motivation is influenced by both intrinsic and extrinsic sources (Alrashidi, 2016: Gelbach et al., 2016; Guay et al., 2000; Jacobi, 2018; Reeve et al., 2003). At a rate of 77.3%, MS students agreed to be motivated by feelings of completion and being a hard worker (see Table 27). Motivation is related to the middle grade student's belief in intellectual achievement within a learning environment and the drive to accomplish tasks (Lin-Siegler, Dweck, & Cohen,, 2016; Oluwatayo et al., 2016; Vaughn, 2018; Veiga, 2016; Williams, 2017). The MS focus group commentary confirmed motivating experiences of "self-improvement," and "get[ting] a lot of work done." One eighth grader commented, "what motivates me is … getting my work done and feeling the accomplishment of getting my work done." Another student described, "students, I should say, that take advantage of it [self-paced

work], get stuff done fast, and then can relax." The quantitative and qualitative results of the study suggest MS middle grade students depend on interactions within the school environment for a developed sense of intrinsic motivation.

Extrinsic motivators in the MS environment were based on progress on personal achievement rather than full completion or comparison to peers. Although not reaching the level of significance (> .75), MS students report continuing steadily toward goals at a rate of 70.7%. The Mann Whitney U revealed a statistically significant difference of $p = .027$, and 81.4% of CPS students continue steadily toward goals (see Table 15). One may infer CPS students are more interested in pursuing goals than MS counterparts. Qualitative focus group data brings clarity to the nuanced experience of the differentiated private school environment. Both MS and CPS learning climates promote a sense of setting and working toward goals. For CPS, extrinsic motivation was highly related to "grades," "improving grades," and getting "good grades." The words "grade," "grades," and "gradebook" were used 17 times. The motivation at CPS was to complete assignments to get a good grade. In MS focus groups, extrinsic motivation through the concept of "grades" for schoolwork was only mentioned in context of relaying to the moderator school does not assign grades to completed schoolwork.

During focus groups, MS participants discussed the topic of the learning process viewed through the investment of time. One MS student stated, "But also in [the online] tracker, you can put in points for, we have like, for every half an hour it's ten points, every hour it's twenty points." Continuing, "that kind of motivates me, seeing adding up points, and trying to get a certain number of points each week." The motivational factors in the MS environment included earning "medals for how many points you get." The program was designed so "everyone can earn a gold," and MS students clarified, "it's not really a competition." Another MS motivational

program included earning “hero bucks.” MS students were also motivated by “parents” and “rewards.” A MS participant described learners as “intrinsically motivated.” A student relayed being motivated by choice and a sense of support in saying, “it’s really motivating to me to think I can try anything, and they can just help.” A MS sixth grader responded, “you have control . . . so that you’re not wasting your time.” Relaxed deadlines were reported as motivating, “there’s no pressure to answer a question quickly or to finish a paper quickly… you don’t have to worry about deadlines and stuff.” CPS focus group comments also included statements regarding the earning of “points.” A CPS student explained, “And with points, you would, you could get stuff to help with, you could get, like, he would have prizes.” Further describing the point system, “you could get chips or something, or candy or, if you had enough points, you could get a few extra points on a test and stuff.” For CPS students, progress is measured as either complete or not complete and is rewarded with external prizes. MS participants described activities allowing for personal investment in individual learning pathways as ways of supporting a sense of motivation.

Table 26

Micro-Schools Survey Frequency Significant Results – Motivation Scale

Item	Reported Frequency*	Strongly Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Strongly Disagree
I like the feeling of finishing any assignment I begin.	**77.3**	49.3	28.0	12.0	4.0	6.7
It is important for me to be a hard worker with school work.	**77.3**	49.3	28.0	12.0	5.3	5.3

Note: * "Reported Frequency" represents combined categories of responses "Strongly Agree" or "Somewhat Agree" for individual survey items. Emboldened yellow items indicate a significance of 75% or greater when identifying the number of agreeable responses.

Motivation is tied to personal goal setting (Kassem, 2019; Kleden, 2015). A difference between the two unique school study settings lies within goal setting, the type of goals and how the goals are set. For CPS students, goals are synonymous with assignment completion. A CPS student explained, "Every time you finished and turned in an assignment, you would get points." Completion goals and timelines in the CPS are determined by teachers. A CPS student remarked, "There is rarely an assignment where I can do what I want." Another CPS participant stated, "I don't think that they(teachers) should give us too much [choice] because then we'll feel like we're in charge and that we just do whatever we want." In the MS climate, goals and timelines are set by students in partnership with guides and may include long-term projects, progress through a personalized learning platform, or a vision for a path in life. Literature discusses an open educational philosophy and environment increase student motivation (Koteskey, 2018; Oluwatayo et al., 2016; Peck et al., 2015). MS participants indicated a sense of openness

increased motivation in the qualitative focus group sessions. The learners described the school experience of timelines for assignments with phrases such as:

- “spend as much time as I need,”
- “no pressure to answer quickly,”
- “you can take your time, you don’t have to worry about deadlines and stuff,”
- “You don’t have to do one thing like exactly at a specific time,”
- “all at your own time,” and
- “you have all day to do them for the most part.”

A MS student described the process, “It’s just personalized to you. The way that I learn may be different than the way that most people learn."

The usefulness and meaningfulness of student work, such as real-world projects examined by experts outside the school community, drive a higher sense of motivation (Rheingold, 2017). MS student data is supportive of meaningful work being motivating, where mere assignments are not. Less than half (46.7%) of MS participants agree to doing an assignment during class because it makes one feel good while doing the activity. The survey revealed the notion of doing an assignment because one wants to, is only agreeable to 37.3% of MS students. On the surface, the results of the survey are inconsistent with MS focus group commentary. The survey items did not capture the broad idea of lessons and experiences as learning tasks. Greater than half of MS students (61.3%) did report finding learning to be enjoyable. MS student comments about enjoyment during the learning process include statements such as, “I think I’ve had a really fun time learning and I’ve really enjoyed learning,” and, “I love this school because we go on a lot of field experiences.” The word “assignment” occurred 1 time in MS focus group commentary compared to 18 times in the CPS discussions.

On the Combined SIMS/PLS, MS participants agreed at a rate of 61.3% school assignments should be done because they are interesting. One MS learner negatively referred to "busy work" at other schools attended and described MS learning as, "you're taught to be curious and engaged in your work." MS students described activities such as "debating the ethics of having [or] keeping animals in captivity," "make our own exhibits," and "doing a food drive now, which is way outside of education." Results from the study indicate students are motivated by the meaningfulness of the learning activities in the MS contexts. Consistent with literature on 21st-century learners' expectation of choice, assignments decided by teachers are not enjoyed; lessons and activities selected by students are enjoyed (Apaydin & Kaya, 2020; Southgate, 2017).

The Bio-ecological Model proposes children need trusted relationships with adults to develop holistically (Brendtro, 2006; Darling et al., 2020). Bronfenbrenner's framework aligns with research indicating high-quality environments with positive peer support and high-closeness with teachers have strong potential for active engagement in the classroom, and higher academic achievement (Darling et al., 2020; Kim & Capella, 2016; Templeton Academy, 2018). MSs form intentional frameworks to incorporate supportive relationships in the learning environment (Templeton Academy, 2018). The theme of Relationships, mentioned 40 times in the MS focus group sessions, connects to motivation. Supportive relationships, both teachers and peers, were identified as motivating factors in the MS learning environment by middle grade participants. The MS classroom was experienced as "really a community," "a giant family," "open," and a place to "belong." One sixth grader declared "community time" a favorite. Students perceive being grouped by "learning level, not too much of age level." The small groups "go outside and do everything together." The hierarchy of teacher-student relationship in the MS was intentionally flattened as an eighth grader concludes, "the creator of [school name] thought that

‘student’ and ‘teacher’ feel more ‘strict’ and they feel more of a role than just a person.” A student described an egalitarian relationship with teachers when saying, “it feels more like you’re engaging with your teachers as colleagues ….” The study revealed relationships within the MS environment also provided emotional safety in the MS environment. Students felt “safe” as “teachers seem to really care.” Students described interactions with teachers who “never made me feel stupid” and walked with learners “through what’s happening,” referring to the uncertain times of a worldwide pandemic. MS students remarked the educators are “interested and want to help kids.” One student stated, “we … are a student led school.” The school allows the student to be “a personal leader of your own learning” and are “encouraged to be active members in their community.” Students “engage in independent study” or “independent learning,” “together as groups,” “reach out to others and get help,” or may “work by myself.” The balance of independence and community is identified as “the best part.”

Educators are able to cultivate motivation in students (Currie, 2018; Fernandes, 2019; Kassem, 2019; Reeve et al., 2003). As the interconnected themes in this study display (see Figure 8), motivating learning environments include flexible learning options, meaningfulness of learning projects, and opportunity for student choice (Bishop & Harrison, 2021; Jacobi, 2018; Vaughn, 2018). Targeted MS institutional missions are to design a learning context rich with a student-centered philosophy, flexible deadlines, meaningful work, and supportive relationships. Almost three-fourths of MS students (72%) take responsibility for learning and do assignments during class because a student is supposed to. Where 65.9% of CPS students are motivated by a sense the work is good for a person, only 49.3% of MS participants agree the motivation for doing an assignment is good for a person. An examination of qualitative commentary reveals MS students do view learning as a personal positive element of school. One seventh grader stated, “I

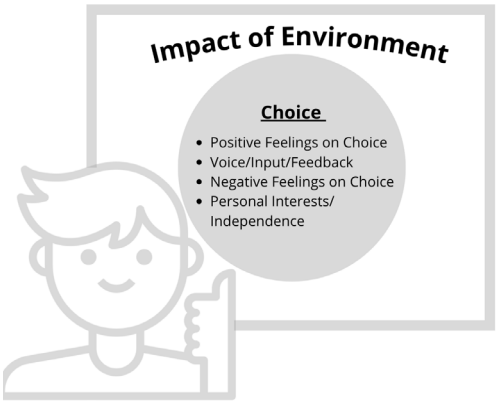
feel like I'm going to be a better adult when it comes to what I feel like is great for the world, just through this school." Consistent with the Bio-ecological Model's theory, the school climate has a shaping impact on students, for MS learners, the concept of schoolwork being "good for me" is a given; learning is a normalized part of everyday living (Bronfenbrenner, 1977).

Research Question 2: Perception of Choice Summary of Results

The second guiding question in the study examines student perception of choice. The researcher sought to understand: How does the micro-school learning environment impact a middle grade student's perception of student agency in regard to a sense of choice? Greater buy-in, cooperation, and self-motivation are credited to students' perceived sense of choice in academic activities throughout 21st-century research (Currie, 2018; Hitlin & Elder, 2007). The complexity of the elements of the microsystem renders an impossibility to discuss choice outside of the context of the whole learning environment (Bronfenbrenner, 1977). The themes of Motivation and Relationships resulting from the qualitative analysis are closely tied to the theme of Choice. Figure 10 displays the topics ascribed to Choice in the constructed clustering process. A sense of choice, student voice, individualized programs, and autonomy are embedded in the MS model to increase student agency (Poon, 2018; Richardson, 2019; Vaughn, 2018). MS participants indicated an average of 66.34% agreement across the 7 items on the Combined SIMS/PLS Choice Scale. The percentages show a great deal of alignment with the value of choice in the MS environment. In the qualitative constructed clusters, 16.3% of MS students' commentary directly mentioned choice. The combined outcomes of the study suggest MS middle grade students appreciate and thrive in the school environment rich in choice.

Figure 10

Impact of Environment – Theme highlight: Choice



Educational research in the past decade underscores the priority of listening to learners to design classroom experiences, embrace connection, allow autonomy, and provide relevance to the life of a 21st-century learner (Apaydin & Kaya, 2020; Jacobi, 2018; Lemley et al., 2014; Montenegro, 2019; Zainuddin, 2018). Of the MS survey participants, 65.8% claim to have opportunities to choose instructional materials, such as books or computer applications, for use in class. Teachers may provide choice through freedom in lessons and providing opportunities relevant to student interests (Currie, 2018; Darling et al., 2020; Kapoor, 2015). Students recognized the MS provided learning opportunities attuned to expressed interests. Students further described choices to be related to "passions" and "what you're excited about." One eighth grade MS student remarked, the school creates "curriculum that mirrors what [students] are interested in, mirrors how they want to learn."

Positive commentary from MS focus group sessions regarding school programming included multiple references to students' ability to choose. MS participants used words such as "choice," "choose," "option," and "allow" 25 times. The MS learners mentioned positive feelings on choice 34 times, individual pacing 23 times, having input at school 21 times, and personal interests or independence 18 times (see Table 23). By contrast, CPS learners mentioned

positive feelings on choice 42 times, individual pacing 26 times, having input at school 12 times, and personal interests or independence 3 times (see Table 24). Both groups of middle grades students desire choice and individual pacing, yet, MS learners have a greater impression of experiencing input, personal interests considered, and independence in learning. The MS student-centered philosophy was consistently evident amongst MS middle grade focus group participants (Artz, 2018; Crischelle, 2020; Horn, 2016). MS students made reference to a student-centered philosophy when making statements such as

- "students can … decide for themselves,"
- "essentially encourage [students] to figure it out themselves,"
- "they (the teachers) allow for that, just everyone making their own choices,"
- "help the students learn the way they want to learn,"
- "we also are a student-led school," and
- "it really depends on what you want to learn and what you're striving for personally."

Consistent with literature, MS middle grade learners expressed the way of life at school with an entitlement to make choices (Apaydin & Kaya, 2020; Southgate, 2017).

MS participants reported a sense of autonomy in the school environment. Personal decision-making in the individual's learning environment was noted (Deed et al., 2014). The study aligns with existing literature claiming the autonomy of choice is an element of student success (Ackley, 2019; Bingham, 2017; Currie, 2018; Jacobi, 2018). The program elements in the MS environment created a positively impactful classroom experience. Participants shared the school they attend is "super personalized" and allows for "curiosity times" and "space for reflection." As a seventh-grade boy remarked, there are

> …several options to do the same thing. So, if you want to type up your answer, you can do that. Or if you just want to say it out loud, you can also do that. So, I think having a huge variety of ways where you can answer the question really help with that environment.

MS students are familiar with customization based on one's choices and preferences. As is noted in current literature, differentiation and individualization were made possible with edtech personalized learning platforms (Crischelle, 2020; Cuban, 2017; Deed et al., 2014; Tarbutton, 2018). Just over 65% of MS students agreed the school had given the chance to work through instructional materials at a faster or slower pace than other students. Students mentioned the use of "Khan Academy" for math at an individualized pace and having individual "Chromebooks." MS Students also reported technology as useful for personal "research" and "tracking" learning. CPS described choice as an opportunity to select how to show one's work, through examples such as "creative freedom to draw it the way we wanted to, "my [math] paper's like all on the same side. So there's freedom in that," or "the teacher gives us three different assessments," and "you have to do all three." The CPS student chooses in which order to do the three parts. Teacher-determined choices are perceived as choice by students, but the options do not lead to the development of student autonomy (Reeve, 2003). MS students described choosing "what you want to learn," as well as, "I did have the choice to control how I learn." The MS climate has potential to expand choice and develop autonomy, self-determination, motivation, and student agency in students (Lemley et al., 2014; Reeve, 2003).

Creativity is identified as a novelty, differentiated from everyday tasks, in traditional classrooms (Davies et al., 2012). A majority of middle grade students, 56% of MS and 88.6% of CPS, report having an option to be creative in classroom assignments and projects. There exists a

thirty-two percentage-point discrepancy on middle grade student perception by school type. The discrepancy may be explained by a differing definition of creativity, or perhaps remote learning during COVID-19 has caused some students to regard creative pursuits as less available. The creativity expressed in the focus-groups sessions does not align with the survey results. MS students reported a positive feeling toward "outdoor experiences" and "presentations." The MS participants described real-world application of learning involving student-creation of interest-driven classes such as "Food for Thought" and "Power of Bicycles." One may regard development of courses as a creative process, yet MS learners may have perceived creativity as making a product in response to a teacher-directed assignment. CPS participants mentioned creative games, designed by teachers such as "noodle tag." The normalization of creative processes embedded in the daily MS learning environment, as opposed to differentiated creative assignments, may explain the lower perception of opportunities for creativity by MS learners. Bronfenbrenner's theory places the normalized experience of creativity in school in the microsystem (Bronfenbrenner, 1979).

The theme of Relationships is connected to MS students' sense of confidence in making choices. The findings of this study are consistent with research indicating 21st-century learners in a choice-laden environment are more likely to thrive relationally (Darling et al., 2020; Hitlin & Elder, 2007; Lemley et al., 2014). MS participants identified positive relationships with both teachers and peers. One student remarked, "We have our whole community to reach out to and go deeper with information." A sampling of multiple comments on peer relationships includes:

- "we spend a lot of time together,"
- "we experience team building,"
- "able to reach out to others, and get help with others,"

- “if we need help, we can ask a buddy,”
- “you can reach out for other [students] for help,” and
- “you can ask anyone for help whenever you want.”

The MS students also relate to teachers in a positive manner as reported by the following participant comments:

- “all the teachers here actually are interested and want to help the kids,”
- “getting a lot of support from their teachers,” and
- “you’re teaching your teachers just as much as your teachers are teaching you.”

Bronfenbrenner claims children need a caring relationship with an adult in life (Bronfenbrenner, 1979; Brentro, 2006). Students within the MS learning environment responded with an overwhelming agreement of 81.3% to feeling one’s opinions are respected at school. CPS participants reported a belief student opinion is respected at school at a rate of 75% (see Table 16). The reciprocating roles of teachers, often referred to as “guides” with the MS students, suggested a sense of mutual respect. Additionally, MS students described feelings surrounding relationships with adults giving choice with words such as “valid,” “empowering,” “taken seriously,” and “I’m important.” An vast majority of the MS participants (81.3%) and CPS students (75%) agreed if given the opportunity to choose a school right now, it would be the school currently attended. Generally, middle grade students in the study are satisfied with the current school setting. Literature reports parents feel accountable for providing proper or appropriate education, especially meeting a child’s personal interest (Potterton, 2020; Prieto et al., 2018). Literature also suggests students in a supportive school climate report a strong sense of attachment (Ozgenel et al., 2018). The data regarding private schools in this study suggest student satisfaction with private school models, whether MS or CPS.

Table 27 displays two items with Reported Frequencies meeting the .75 threshold of MS participants on the Choice Scale of the Combined SIMS/PLS survey. The high level of reported satisfaction of young people, who as a generation expect choice, lends credence to the notion of students' perception of thriving in the MS environment. Sentiments are summed up by one MS student remarking, "But we get to make up, for the most part, what we are learning. And we get to make up the rules and structure and we get to tell our teachers … what we want to learn about and sometimes give them feedback. And I think it's really important for a learning environment."

Table 27

Micro-schools Survey Frequency Results – Choice Scale

Item	Reported Frequency	Strongly Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Strongly Disagree
My opinions are respected in this school.	**81.3**	52.0	29.3	8.0	6.7	4.0
If I could choose a school right now, it would be this school.	**81.3**	58.7	22.7	9.3	5.3	4.0

Note: * "Reported Frequency" represents combined categories of responses "Strongly Agree" or "Somewhat Agree" for individual survey items. Emboldened lavender items indicate a significance of 75% or greater when identifying the number of agreeable responses.

When comparing groups by school type, the Recorded Frequency table and Mann Whitney U resulted in one item on the Choice Scale as significant (see Table 18). The MS responses (*Mean Rank* = 53.89) represents a 15.04 difference from CPS (*Mean Rank* = 68.93) on the perception students work on different topics or skills than what classmates are working on at the same time. The lower MS statistic suggests MS students perceive a greater opportunity to

work independently from a group of peers. On initial analysis the data seems to affirm MSs are able to engage in personalized learning. Notably less than half of MS students (44%) and just above a quarter of CPS students (27.3%), agree to the stated opportunity. Qualitative commentary does not align with implications of the low percentage of agreement. MS students stated,

- "All our math and reading and independent writing projects and all of that are all on your own time,"
- "you can really turn in the challenges anytime,"
- "[you can] sit down by yourself in a corner and do your own work," and
- "I really enjoy having the ability to work by myself."

The combined outcomes point to a reality perceived by MS students that MSs are student driven and individually paced (Kapoor, 2015; Koteskey, 2018; Templeton Academy, 2018).

Literature claims an individuals' autonomy to make decisions about cognitive growth is a key aspect of student agency (Deed et al., 2014; Hitlin & Elder, 2007; Poon, 2018)**.** The central set of seven items on the Combined SIMS/PLS addressed the perception of choice. On 4 out of 7 items on the Choice Scale, MS students gave a greater percentage of Strongly Agree and Agree responses than CPS participants. This suggests a slight increase of perceived choice in the MS setting. The range of Reported Frequency on the Choice Scale for MS participants was 44 – 81.3, and for CPS 27.3 – 88.6. On the Choice Scale, MS frequencies were 37.3 points apart, and CPS scores spread by 61.3 points. The narrower spread of MS frequencies suggests a more consistent feeling across the MS group in regard to the topic of Choice. Perhaps the greater alignment in understanding and experience of student choice is attributable to the difference in school climate. In focus group discussions MS students reported "academic flexibility" and the

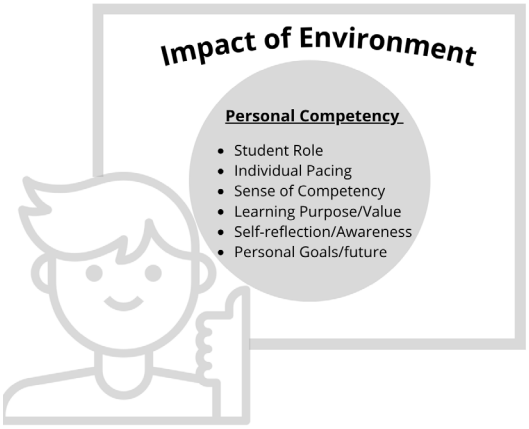
opportunity to “choose what you want to learn at times,” “several options to do the same thing,” and to “decide for themselves.” The freedom was expressed as “you don’t always have to do what the [teacher] says,” “… it really depends on what you want to learn and what you’re striving for personally,” an eighth grader replied. Learner input is “taken seriously” and participation in designing curriculum is described as “more surrounded by life lessons and just more activities.” Students are “very much so encouraged to engage in independent study.” MS students shared “guides” ensured “all the students had a choice.” MS learners exercised “curiosity” and “explore” as a regular program element. “We don’t really have real lessons” a student commented, comparing to students with “a teacher in the front of the room.” In an empowered tone, a student stated, “you can choose to learn on that [a selected lesson] so you can catch up on things.” A student told the story of selecting an individual math program outside of the regular school curriculum and reported the “guide set me up on it and I started using it.” Positive comments such as, “I really like making my own choices,” and, it feels “really empowering,” were the predominant sentiment. Work is described as “hands-on,” “real-life,” “project-based learning,” “videos,” “language-based” math,” “make our own exhibits,” “independent writing projects,” and “field experiences.” Choice is a key ingredient of a quality 21st-century classroom environment (Lemley et al., 2014). The Bio-ecological Model theorizes immersive elements of the child’s microsystem are experienced as a normal part of daily life (Bronfenbrenner, 1979; O’Neill, 2015). The immersive and consistent element of choice in the MS environment results in MS students experiencing choice as a normalized, expected, element of the learning climate (Richardson, 2019; Southgate, 2017).

Research Question 3: Perception of Competence Summary of Results

Relying on the assertion of competency and student agency as partners in student success, the third research question examines middle grade students' perceived level of competency (Darling et al., 2020; Hitlin & Elder, 2007; Lemley et al., 2014; Russell, 2018). The researcher examined: In what ways does the MS learning environment's use of a personalized learning platform impact student agency in regard to a middle grade student's sense of competency? MS participants indicated an average of 73.2% agreement with items on the Competency Scale with the Combined SIMS/PLS survey. The frequencies of agreeable responses show robust alignment with the sense of competency in the MS environment. Of the three subscales on the Combined SIMS/PLS, the Competency Scale yielded the greatest number of highly agreeable items. Six of the fourteen resulted in a Reported Frequency greater than .75, and only one item fell below .60, at .595. In the qualitative constructed clusters, 19.7% (98 out of 498) MS students commentary mentioned categories related to competency. Of the six constructed clusters of themes, Personal Competency ranks as the third major element of discussion in the MS commentary. The combined outcomes of the study suggest MS middle grade students develop a strong sense of competency in the MS learning environment with personalized learning. Figure 11 provides a visual of the topics within the theme of Personal Competency.

Figure 11

Impact of Environment – Theme Highlight: Personal Competency



Johnson and Puplampu (2008) propose technology as a sub-system within the microsystem of Bronfenbrenner's Bio-ecological Model (Bronfenbrenner, 1977; 1979) (see Figure 2). Advancing educational technology companies offer online platforms for personalized learning opportunities (Bi & Shi, 2019; Bingham, 2017; Buzzetto-Hollywood & Alade, 2018; Cohen, 2017; Cuban, 2017; Curry & Mania, n.d.; Hui, 2016). Research reports 21st-century learners find technology solutions through personalized learning platforms to enhance teaching and learning in schools, even in the student role (Hefty, 2014; Rue, 2018). Table 28 presents Reported Frequency of MS student responses on the Competency Scale of the Combined SIMS/PLS. MS learners keep track of learning progress by using technology at a rate of 72.9% agreement in comparison to 59.1% by CPS students. The data suggests MS students may perceive technology as more central to the learning experiences than CPS students. A CPS student commented, "I learn better [with] a teacher actually teaching me than like a program or something."

Personalized learning platforms in a small community present potential for improving learning experiences (Christakis et al., 2018; Cuban, 2017; Miller et al., 2014; Peterson, 2011).

While research suggests digital platforms may increase student motivation, the MS students recognized both positive and negative aspects of technology as part of the learning environment (Batsila & Tsihouridis, 2016; Zainuddin, 2018). During the MS participant focus-group sessions, technology was referenced 47 times. Technology was threaded throughout the MS programs. Phrases like "online platforms" and "virtual labs" described the experience. Students also reported, "we're not glued to our screens all day." One student used her phone and computer "for organization" and "writing notes." Students reported being motivated by an online "journey tracker" and were grateful for "online resources." Comments such as, "it helped me form more of a schedule," "I can definitely learn more about a topic," and "intense independent work," describe perceived benefits. A seventh grader stated he could "design things super easily in a lot of online resources." Students viewed individualized pacing through personalized learning software as accessible and positive. "Some of the kids are super motivated and … speed through everything." Describing a classmate, one learner remarked, "[she is] already learning at a high school level so [school name] is a really good fit for her." A MS fourth grader replied, "you don't have to learn one specific thing," and, "it feels like you can learn a lot better." Another remarked, "I can spend as much time as I need on that specific topic." Qualitative comments revealed CPS students viewed educational technology as an additional element of the classroom through statements such as "go on[line] … and check the instructions," or "our teacher gives us three different assessment thingies to do. And they're like you can work at your own pace." Recognizing a perceived difference between "regular" learning time and time with technology, a CPS student proposed, "In science class we're learning about plans, so the stuff that he doesn't teach us, I can look it up and research if other than if I was, if it was just a regular day and we

didn't have technology and I would just have to go on the top of my head and the things I had learned."

Table 28

Micro-schools Survey Frequency Results – Competency Scale

Item	Reported Frequency	Strongly Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Strongly Disagree
It's important to me that I completely understand my school work.	**78.7**	42.7	36.0	12.0	4.0	5.3
I have opportunities to review or practice new material until I really understand it.	**81.3**	46.7	34.7	8.0	5.3	5.0
I can do almost all the work assigned in school if I don't give up.	**81.3**	44.0	37.3	9.3	2.7	6.7
Even if the work is hard, I can learn it.	**82.7**	45.3	37.3	10.7	1.3	5.3
I use what I've learned from previous assignments and what I have learned in school to do new assignments.	**80.0**	40.0	40.0	10.7	2.7	6.7

When I'm learning something new, I try to connect the things I'm learning about with what I already know.	**74.7**	36.0	38.7	14.7	2.7	8.0

Note: * "Reported Frequency" represents combined categories of responses "Strongly Agree" or "Somewhat Agree" for individual survey items. Emboldened lavender items indicate a significance of 75% or greater when identifying number of agreeable responses.

Literature links the awareness of self, peer opinion, and self-evaluation with the establishment of personal worth and competency (Harter, 1982; Wolff et al., 2019). The survey results reveal 78.8% of MS participants have a desire to completely understand schoolwork. Also, 81.3% of MS students have opportunities to review or practice new material until it is fully understood. The combination of responses implies MSs have created an environment to enhance self-evaluation and self-awareness. MS participants demonstrated thoughtful evaluation and self-awareness, with phrases including:

- "a lot of [school name's] curriculum lies in understanding self and reflecting on growth,"
- "helps students clearly understand how their mind works,"
- "my group is doing a lot of things around critique and … self-improvement,"
- "kids are aware of the negative impacts,"
- "helps them to step back and realize," and
- "I think I can definitely learn more about a topic."

Research claims competence is related to a preference for challenge, a desire for independent mastery, curiosity, and increased success in school (Bjorklund-Young, 2016; Harter,

1982). Literature suggests a sign of competence is approaching an unknown problem with curiosity and an attitude of capability (Currie, 2018; Harter, 1982). Survey results revealed 81.3% of MS students have the capacity to push through challenges and can do almost all the work assigned if not giving up. MS students (82.7%) believe learning is possible even if the work is hard. MS focus group discussions substantiated quantitative outcomes through student expressions of being a "personal leader of your own learning," having a "strong understanding of questioning things," and believing "you're teaching your teachers as much as your teachers are teaching you." To handle challenges, MS students expressed a sense of taking responsibility in the learning environment as well, when making remarks such as "it's probably part my fault too," and, "it's really powerful to … encourage students to figure it out themselves." MS participants shared a sense of ownership over the learning process.

Literature communicates the importance of educators embedding values of connection, autonomy, and relevance in learning experiences (Apaydin & Kaya, 2020; Jacobi, 2018; Lemley et al., 2014; Montenegro, 2019; Zainuddin, 2018). Survey results show the majority (80%) of MS participants use what was learned from previous assignments and what was learned in school to do new assignments. Likewise, 74.7% of MS students try to connect the current learning topics with what is already known. MS students, at a rate of 70.7%, have the ability to connect learning activities to real-life situations. Qualitative comments align with the survey outcomes as a MS student relayed the activity at the "Denver Zoo" as "a very real-life, hands-on experience." Another mentioned practical classes called, "Food for Thought" and "Power of Bicycles." MS participant survey responses support a perception of relevance in the learning design.

Published explanations of competency suggest classroom environments provide opportunities for increased aptitude to act effectively (Bronfenbrenner & Evans, 2000; Lemley et

al., 2014). In the study, MS student comments provided insight into activities designed to develop competency through choice and success. A student shared she feels she will be "a better adult" because of the experience in the MS. Another shared, "you're independent," yet there is "community time" to join a "workshop or a club." MS learners build confidence by "feeling the accomplishment of getting the work done." Another MS student related choice to competency when stating, "… you can choose what you want to learn at times … you don't just always have to do what the guide says." Teachers were given the role to "guide us on our learning journey." Students in both MS and CPS environments were given opportunity to develop skills in conflict resolution. When social conflict arises, one MS group described the support of a "peace table" protocol involving a guide who invites both parties to "tell … their point of view [of] what just happened." As the conflict is resolved, "they shake hands at the peace table then they give forgiveness." Learners express "students should always be asked about the things they're learning." CPS also shared about teacher support when peers "fight" at school. One student shared, "here [current school] is a nice place where if someone gets in a fight, the teacher can work it out and they hug each other and say, 'Do you forgive me?'" The opportunity to act effectively, with guidance from educators, is evident in both MS and CPS models.

Digital natives were born into a tech-saturated world in which ICT is normalized in all aspects of life (Jha, 2020; O'Neill, 2015; Prensky, 2001). Negative elements of educational technology were perceived in MS responses such as, "technology negatively affects kids' brains" and students should be "wary of how addicting it can be." Also, focus group sessions identified "too much screen time" as detrimental and possibly a "distraction." Negative factors such as technology being "addicting," "spread of misinformation," "social media," or troubleshooting issues with "submit[ting] online" came up in discussion, and students relayed an appreciation for

the school ensuring “kids are aware of the negative impacts.” Some MS students viewed personalized learning opportunities as demotivating. Two eighth grade MS students commented about leveled math. One reported ,“It was like going back to fifth grade for a year” when the math program measured his aptitude, and the other responded it was “kind of demotivating because the rest of the people in my group were ahead.” The group praised efforts within the community for face-to-face interactions, rather than online, and warned of possible addiction to technology. The criticism of overuse of one learning tool suggests MS students view edtech as normative rather than a novel element of school. The use of edtech is pervasive in the 21st-century learning innovative classroom (Byers et al., 2018; Johnson & Puplampu, 2008).

Literature proposes students perceiving a high level of self-competence are more motivated to engage in learning activities (Jacobi, 2018). The Mann Whitney U results support the implication MS and CPS students do not differ substantially in the perception of competency. Mann Whitney U calculations indicate CPS students (*Mean Rank* = 51.43) report the personal goal of learning as much as one can in school to a greater level of agreement than MS counterparts (*Mean Rank* = 63.56). The Reported Frequency aligns with the Mann Whitney U results, at a rate of 75% CPS students reported a higher degree of agreeability than MS students (59.5%) on having a goal to learn as much as one can in school. In closer examination of the data, only 14.9% of MS students disagree, and 25.7% of MS participants marked neither agree nor disagree with the claim. On the Competency Scale, having a goal to learn as much as one can in school is the highest reported neutral score for an item. CPS students marked the neutral response at 18.2% and 6.8% disagree. Both private school types set learning goals, however, the MS model’s focus on depth of learning rather than breadth of learning may provide some clarification. Literature describes MSs as educational programs with a specific emphasis on

allowing students to pursue personal interests (Crischelle, 2020; Templeton Academy, 2018). MS students reported going "deeper" into topics and beyond "the basics." Contrarywise, CPS students expressed a sense of following a prescribed path regardless of interest when stating, "we have to, like you need to read this thing," "it's like a little exercise that you can usually do by yourself," and continued, "it's due at the end of the week," and "the whole class is watching this little slideshow while the teacher controls when we go to a different slide." As Bronfenbrenner suggests, the school environment has a complex and personal impact on the student's development (Bronfenbrenner, 1977). The school environment may impact the students' perception of how learning is measured, whether by submitting a prescribed assignment by a deadline, or spending time pursuing a topic of interest at a deeper level.

Competency is connected to motivation and may be measured by observable behaviors (Currie, 2018; Harter, 1982; Lemley et al., 2014). Middle grade participants of both school types reported a sense of mental capability to do school assignments. Both MS (81.3%) and CPS (81.8%) participants report an ability to do almost all the work assigned in school if not giving up. Further, there is a shared belief by 82.7% of MS students and 90.9% of CPS students, even if the work is hard, it can be learned. Lastly, 80% of MS and 90.9% of CPS learners use what has been learned from previous assignments to do new assignments. Focus group discussions solidify these findings, with comments such as, "I can definitely learn more," by a MS student. One MS participant stated, "like if I wanted to learn about an animal, I could just type that animal in and go to a site that teaches me all about it. And I think that's the best way to use our technology." One CPS student stated, "you can … challenge yourself to see how well you do," speaking about an online learning game.

The growth of student agency involves a process to act on one's behalf with self-confidence, grit, autonomy, self-initiation and planful competence (Poon, 2018) (See Figure 3). For both MS (78.7%) and CPS (84.1%) participants, it is important to understand schoolwork completely. Across both school types, middle grade students demonstrate planful competence (Poon, 2018). Both groups of students, MS (73.3%) and CPS (84.1%), agree to knowing the goals of what an assignment or activity are when working on the assignment or activity. A CPS participant shared, "every day we do planners." One MS focus-group member, when speaking about the future, remarked the school "sets them up for a lot of success." The comments substantiate the shared experience of thinking ahead by middle grade students in both represented school types. The short-term focus of the CPS students on a daily planning time does not equate to the depth of the MS student experience of planning for life outside of school work. Students felt the MS environment was preparing them for life beyond the classroom. "I … think it's a very big part of just life, … to be open and to say things and to compliment people," a seventh grader replied. An eighth grader stated, "you're taught to be curious and engaged in your work, in your society." Another applicable remark, "it feels like what you're doing is making an impact on your society," underscores the concept. Finally, after describing a community food drive, another seventh grader shared, "you're not just learning about the problem, you're helping fix it." The Bio-ecological framework places the school environment within the highest level of impact on the developing human's mindset (Bronfenbrenner, 1977, 1979). The phenomenon of MS students' developed sense of planful competence to engage meaningfully in life beyond school is influenced by the MS environment.

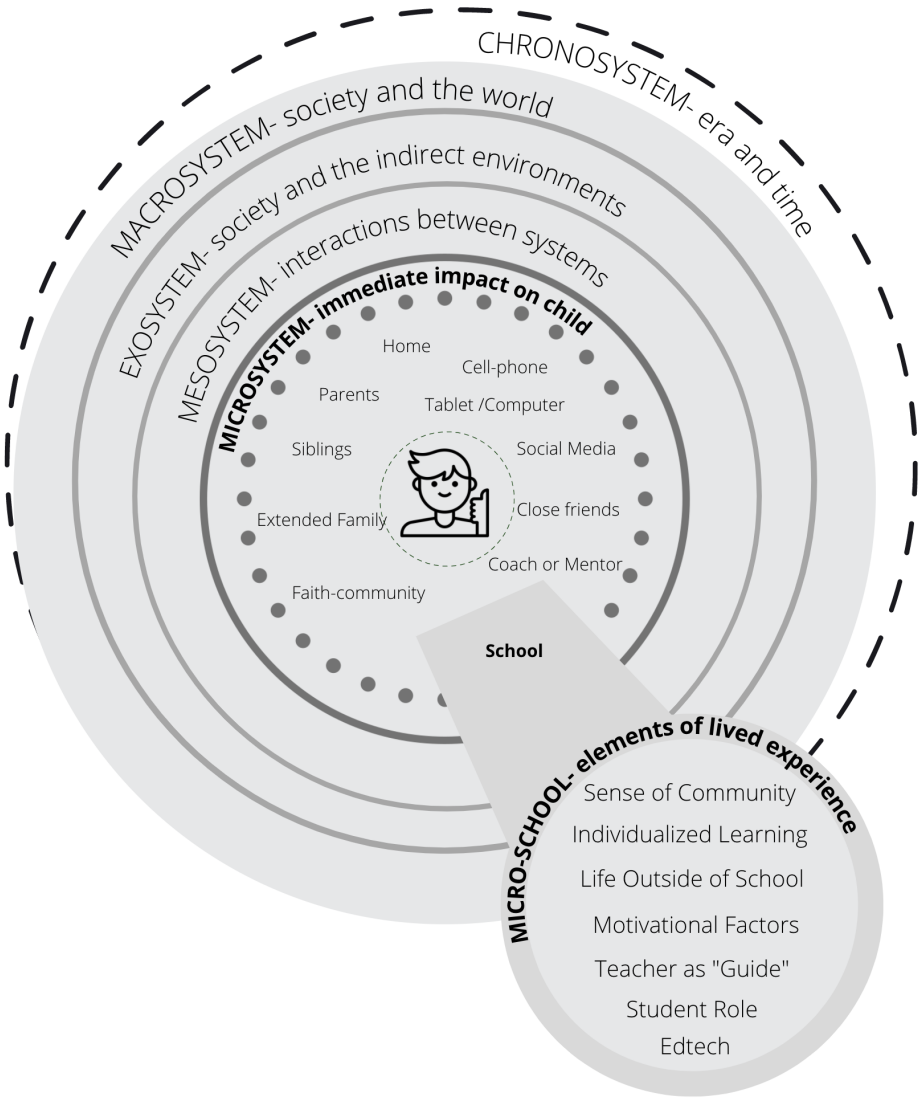
Conclusions

The school learning environment is situated as a core influential element in the innermost level of a child's development (Bronfenbrenner, 1977; Johnson & Puplampu, 2008; O'Neill, 2015). Educational policymakers and reformers make 21-st century schools accountable to address and develop non-cognitive elements of learning (Bjorklund-Young, 2016; ESSA, 2015; Michelman, 2018; Tarbutton, 2018). Alpha Generation and Generation Z cohorts, growing up in a tech-saturated society, benefit from a school environment designed with embedded instruction of non-cognitive skills (Lemley et al., 2014). The findings of this study serve to confirm the micro-school environment, with an intentional overlay of a student-centered philosophy, personalized learning, and small mixed-age classroom settings, has a positive impact on the development of three elements of student agency: motivation, choice, and competency.

The MS environment, the backdrop for Research Questions 1 – 3, is a central piece of the study. To set a context for the conclusions of findings, the researcher utilized direct words and phrases of MS participants to construct a mental picture of the MS environment as the lived experienced of the study's participating learners within the micro-system context (Creswell & Creswell, 2018; Murawska & Walker, 2017). Figure 12 identifies the elements of the MS environment as a modification to the Johnson and Puplampu (2008) Ecological Techno Subsystem diagram (see Figure 2).

Figure 12

Elements of Micro-school Lived Experience Embedded in Microsystem



Note: Created by researcher as an adaptation from *Internet Use During Childhood and the Ecological Techno-Subsystem*, by Johnson & Puplampu, 2008. Copyright 2008 by the Canadian Journal of Learning and Technology. Used as an open source under a Creative Commons Attributions License.

Bronfenbrenner's Bio-ecological Model emphasizes the impact of the microsystem on human development (Bronfenbrenner, 1977). The Bio-ecological model places the school in the center ring, the microsystem, of the concentric influencers in a child's life (Bronfenbrenner & Evans, 2000; Johnson and Puplampu, 2008; O'Neill, 2015). The innovative MS model's mission statements claim to immerse students in an intentionally student-centered, learner-driven environment in order to develop student agency (Crischelle, 2020; Horn, 2016; Templeton Academy, 2018). Data from the study confirmed the participating MS sites offer unique elements related to human flourishing, focusing students on living out a meaningful life, developing connections to others, curiosity, inquiry, adventure, character building, and taking action in important world matters. The MSs in the study target building a sense of identity and agency in students for interacting in the world beyond the campus and future endeavors. The MS students spoke of experiencing self-discovery activities, close-knit relationships, and individualized learning pathways. Relationally, students described teachers as guides and peers rather than in traditional age-based grade levels, were viewed as humans in a shared learning space with connections driven by interest and ability.

Results of the study suggest the consistent interaction with school environmental factors lead to a sense of normalized experiences. Research recognizes the school environment has an enormous impact on the developing human's typical expectations and reactions (Latsch, 2018; Lemley et al., 2014; Oluwatayo et al., 2016). Aligned with the Bio-ecological model, the learning environment shapes the developing child, due to consistent extended exposure over a span of time (Bronfenbrenner, 1977; Christakis et al., 2018; Johnson & Puplampu, 2008; Latsch, 2018; O'Neill, 2015). The findings show learning, inquiry, and engaging creative processes are perceived as everyday occurrences in the MS. Access to educational technology, supportive

peers, egalitarian relationships with teachers, and consistent choice were simply expected as ordinary elements of school. Elements intended to develop student agency are so entrenched in the MS environment, students experienced activities as typical and automatic.

Combined results of the study support literature identifying MS students participate in shaping educational decisions (Kapoor, 2015; Linaberger, 2018; Sigurðardóttir & Hjartarson, 2016). Survey results revealed a majority of MS students perceived an opportunity to select learning activities. Commentary from MS students, showed intrinsic motivation is enhanced with regular access to effective and personalized technology, power to choose and act in alignment with personal interests, and a flattening of traditional hierarchical roles in the educator-student relationship. MS teachers were named "guides" as an intentional effort to project a more egalitarian relationship with students. The guides were experienced as partners in the learning process. The findings showed MS students expressed an inner motivation to invest in learning beyond just completing work. Students were able to participate in the process of building learning activities from ideation, to design, to implementation, to assessment, and finally to real-world application.

The findings substantiate research suggesting digital platforms increase student motivation (Batsila & Tsihouridis, 2016; Zainuddin, 2018). Studies of the 21st-century classroom indicate educational technology is an ever-increasing part of the learning environment (Byers et al., 2018; DeArmond & Maas, 2018; Johnson & Puplampu, 2008; Kormos, 2018; Peck et al., 2015). Edtech is becoming more commonly provided as an extension to traditional classroom activities (Education Reimagined, 2015; Hui, 2016). The study shows ICT in the MS environment provides a regular cadence of opportunities for choice and personalized learning. The findings from MS students revealed a comfortable familiarity with ICT. MS students

reported using technology for research based on personal interests, tracking individual progress, interacting or collaborating with peers, designing models, creating presentations, submitting assignments, working on self-paced projects, taking learning style assessments, using mastery based leveled subject-specific applications, and video-conferencing.

Research acknowledges student-to-student relationships play a large role in middle grade students' sense of motivation, belonging, and engagement (Eisenbach et al., 2020; Kiefer et al., 2015; Sørlie et al., 2020; Templeton Academy, 2018). In the study, competency through supportive relationships is revealed as a strong trait in private school middle grade students, whether attending a MS or CPS. Literature links learner success to student agency empowered by a positive teacher-created environment and teacher-student relationships (Currie, 2018; Darling et al., 2020; Fernandes, 2019; Lin-Siegler, Dweck, & Cohen, 2016; Luo et al., 2019; Russell, 2018; Sørlie et al., 2020; Vaughn, 2018). Recognizing the purpose of the school design, multiple students in MS and CPS groups spoke of the high level of care they perceived from the educators at school. Students experienced and identified motivational factors, opportunities for choice, and a sense of competency in both private school models. Research indicates a sense of belonging and school attachment enhances student well-being (Ozgenel et al., 2018). An overwhelming majority of participants from participating MS and CPS students would choose the school they are currently attending, if given the opportunity to select "right now." The findings reveal school attachment is strong for both MS and CPS private school middle grade students, indicative of a personal knowledge and adoption of the mission and purpose of the school.

Recommendations for Further Research

A timely study, the researcher examined the impacts of the MS environment on MS middle grade students' perception of three elements of student agency: motivation, choice, and competency, in comparison to CPS middle grade students (Mameli et al., 2019; Oluwatayo et al., 2016; Wolff et al., 2020; Wall et al., 2018). The COVID-19 requirement to send students home to pursue education virtually heightened educators' awareness of students' need for engagement, relationships, and ownership of learning (Avery et al., 2021). In the eminent climate of post-pandemic schooling, the field of education may benefit from a greater understanding of smaller school models, able to pivot with agility and support for 21st-century learners (Capoot, 2020; Zimmerman, 2020).

This study is limited in scope, including only three MSs and a relatively small representative population of CPS students. The sample size, 119 middle grade students, is adequate for the study, however, expanding the sample size would increase the validity and generalizability of similar studies (Creswell & Creswell, 2018; Hoy & Adams, 2018). The study could be replicated to include a larger number of MS sites. Additional MS sites would assist in developing a common set of characteristics and bring definition to the model (Cohen, 2017; Curry & Mania, n.d.; Horn, 2016; Prothero, 2016; Koteskey, 2018). Further research could include replicating a similar study with a comparison to traditional public-school classrooms. Including public school and public charter middle grade student perspectives may yield outcomes to assist educators in understanding differences of an alternate environment, other than private school to private school presented in the current study.

Beyond the scope of this study was a deeper exploration of the upcoming Alpha Generation. Already recognized as a differentiated group, the cohort possesses traits variant

from Gen Z (Jha, 2020; McCrindle, 2020). Born after 2010, the eldest members are just entering the distinct middle grade years (Akos, 2004; Bishop & Harrison, 2021). Post COVID-19 schooling may require a generation to engage resilience, restraint, and reconnection. As 21st-century learners, with a distinguished set of characteristics, the cohort will have opportunities to take advantage of innovative school models as MSs mature. Researchers should remain attuned to the needs and perspectives of upcoming teens by continuing studies aimed at gaining student viewpoints to increase the understanding of the needs of the Alpha Generation.

The innovative MS model, a renewed one-room schoolhouse concept for education, has been in existence since the early 2000s (Artz, 2018; Crischelle, 2020; Horn, 2016; Koteskey, 2018; Prothero, 2016). The literature on MSs is scarce, and a body of evidence exists to support the continued study of elements of student agency in innovative school models (Reeve & Tseng, 2011; Vaughn, 2018). Further research projects targeting innovative small schools' learner outcomes will continue to be necessary to add to a rather diminutive body of literature as research practice demands (Lopez-Alvarado, 2017).

The field of education is benefited when educators share knowledge of constructs and methodologies that work to meet the needs of learners (Tyack & Cuban, 1995). When studied and shared, innovative designs at the micro level may benefit other educators and institutions (Katzman, 2012). Understanding student perspectives in the MS is a start, yet exploring the perceptions of MSs founders, parents, and facilitating educators could also yield valuable information in seeking understanding of the unique school climate (Hoy & Adams, 2016; Tyack & Cuban, 1995). In the coming decade, designing a reflective study, that is, working with young-adult graduates from MSs, currently attending college or university, could assist the educational community in understanding outcomes of the MS approach (Creswell & Creswell, 2018).

Beyond obtaining student perspectives, MS environments should be studied via phenomenological or ethnographic approaches to observe the innovative educational practices in action (Creswell & Creswell, 2018). Behavioral observations in the MS learning space, open both philosophically and physically, including freedom of choice and fewer directive actions by instructors, could deepen the understanding of the integration of non-cognitive skills in the MS environment and benefit the development of future schools (Darling et al., 2020; Deed et al., 2014).

Implications for Professional Practice

The results from the examination of a unique 21st-century innovative school design calls educators and reformers to take notice and take action to saturate school environments with factors designed to normalize classroom experiences expected to develop student agency. An initial action step includes augmenting pre-service teacher training and professional development for practicing educators to include instruction on elements present in MS environments. The study also provides a launching point to substantiate the further application and exploration of elements present in the MS climate through action research at the practitioner level, applying effective findings to practices in public, charter, and other private schools. The results encourage middle school leaders of all school types to act with immediacy to instill engagement pertaining to the mission and purpose of the school, creating student attachment and belonging. Finally, due to positive results of this examination, policymakers and edu-trepreneurs may move forward in decision-making regarding school choice and solicit funding for charter or private school models.

Teacher training is integral to the implementation of modern classroom practices as new educators must have a vision for innovative ideas to reach a new generation of students

(Kelchtermans, 2017; Storz & Hoffman, 2013). Training must include explorations of current ideas on positive classroom environment creation (Williams, 2017). This study confirms prolonged exposure to stimuli in the environment of the developing child become normalized experiences (Bronfenrenner, 1977). Educators in both private and public school climates must work to build positive environmental factors, present in MSs, into classroom and school wide initiatives, such as promoting the mission and purpose of the school to increase attachment, embracing a student-centered philosophy, infusing student voice in the "what" and "how" of learning, providing consistent access to personalized learning platforms, flattening the hierarchical structure in the teacher-student relationship, engaging creative processes, and devising infusion of real-life application of learning activities. To accomplish the embedding of the targeted MS elements, universities should validate practicums for pre-service educators in credentialing programs, having candidates serve in multiple practicums to include experiences in traditional school settings as well as alternative learning environments. The mandatory observation hours or field experiences allow students to witness specific strategies in innovative school climates, and application of innovative instructional models studied during pre-service training activities. Teachers in pre-service programs would benefit from an intersection with multiple inventive school models through interaction with both educators and students directly experiencing alternate learning climates.

Likewise, the same vision regarding student-centered, innovative models needs to be cast for in-service educators through professional development. It is essential to update current practitioners in all school models, both public and private, on trends in education, as teachers hold a crucial role in the implementation of learning strategies (Donsky & Witherow, 2015; Kelchtermans, 2017). Regardless of the type of learning environment, schools cannot remain

stagnant in the development of the classroom strategies constructed to create positive and effective learning experiences for students. Many of the innovative MS elements described within the findings of this study may be implemented in any given school environment, holistically or individually (Kelchtermans, 2017). Public school administrators could choose to have teachers and students collaborate in exercises aimed to define the school's mission and purpose, or assign teachers accounts as mock students on personalized learning software to begin looking through lessons in the position of a learner. Traditional public school principals could organize workshops on student voice and choice identifying strategies for allowing students to choose "what" to learn along with "how" to show outcomes. Not all educators are convinced PL deals with the sociological elements of developing humans (Goral, 2018; Williamson, 2018). Administrators, in both private and public contexts, should incentivize teachers to earn CEUs and work in tandem with local and online colleges to design a specific "School Ecosystem Strategies" certificate. Certificates would be earned via online platforms, designed to immerse the educator in effective strategies for creating positive school culture including a personalized learning framework similar to what students may encounter.

While the majority of American families meet educational needs through larger school systems run by government policies, some parents invest in innovative schools to meet the needs of children (Cohen, 2017; Kessinger, 2011; Koteskey, 2018; Lopez-Alvarado, 2017; Project Tomorrow, 2015; Templeton Academy, 2018). Though parents may be willing to risk enrolling children in innovative learning models, the field of education relies on empirical studies to validate effective learning approaches (Cohen, 2017; Creswell & Creswell, 2018; Koteskey, 2018). Progressive educators and the renown of founders of MSs also call for an examination of the innovative practices (Curry & Mania, n.d.; Darling & Gelernter, 2017; Prothero, 2016).

Innovative schools, free from many of the mandates of public school systems, may point to results of this study as an indicator of the efficacy of the model to prospective parents. Building on the expressed perspectives of MS students, current innovative schools may enhance programs to include effective elements such as renaming teachers to be "guides" to communicate a partnership rather than a hierarchical authority structure. To advance student agency, alternative schools may intensify the student-centered approach by adding an online progress tracker, a learning style analysis for students, and a direct on-boarding process for students moving from a traditional into an innovative climate. Results from this study provide confirmation for current innovative school leaders to work with community members such as zoos, horticulturists, City Hall, libraries, local laboratories, retail headquarters, and the like, to bring in experts and offer the creative thinking of young learners on real projects.

The qualities of student agency align with a call to embed effective strategies in the 21st-century classroom (Poon, 2018). Public school systems enroll the majority of America's students, and therefore have a moral obligation to instill appropriate and effective skills in students. With the requirement to assess non-cognitive aspects of learner development, public school practitioners may use outcomes from this study to discover methods of developing student agency in an increasingly tech-rich classroom environment (Bjorklund-Young, 2016; Every Student Succeeds Act [ESSA], 2015; Michelman, 2018; Tarbutton, 2018). Setting up mock student accounts, and impersonating a learner on personalized learning platforms, may give a teacher a view of the student experience. Following up this exploratory engagement with class discussions, will work to build trust with students and break down unnecessary barriers between teacher and learner. Classroom teachers may use words such as "guide" and "facilitate" in place of more authoritative language, to further reduce the perception of hierarchy.

In order to establish research-based strategies, effective in developing and educating 21st-century learners, action research of innovative practices by educators in public, charter, and other private school classroom settings must be conducted and shared (Creswell & Creswell, 2018; Stuart et al., 2017). In MSs, intrinsic motivation is enhanced with regular access to effective and personalized technology, meaningful lessons, and supportive peer and teacher relationships. Action research projects could include the piloting of self-paced personalized learning software programs, the collaborative development of a class passion project to solve a real-world problem, or grade levels within a school piloting a mixed-age unit to explore a topic of interest and create a presentation to share schoolwide.

Literature describes a sense of attachment and belonging a student develops when experiencing a supportive and safe school climate, enhancing a learner's well-being (Ozgenel et al., 2018; Shakeel & DeAngelis, 2018). Research further describes students in the distinct preteen developmental stage operate in an insecure mental, physical, and social state, with the disequilibrium of school-structure or change only adding to the uneasiness (Akos, 2004; Bishop & Harrison, 2021; Harter, 1982; Kiefer et al., 2015; Kim et al., 2014; Sørlie et al., 2020; Starks et al., 2018). Remarkably, whether MS or CPS, middle grade participants from both private school models reported strong attachment. A sense of ownership and loyalty was robust as the private school students readily spoke about what makes school "special." Participants openly and easily expressed a personal knowledge and adoption of the mission and purpose of the school. An overwhelming majority of participants revealed belonging and strong attachment to the private school they attend, by stating they felt respected and would choose the school if given the opportunity to select "right now." To counter the possible deleterious factors in the middle grade students' developmental stage, middle school administrators and educators, public, charter, or

private, must communicate the purpose and mission of the school directly to students, creating identity among learners. Further, the programs must embed instructional practices aligned with listening to student opinions and promoting pride and belonging to the school community. In a public middle school, for example, school pride could be embedded in the climate by naming location, roles, and programming according to the school mascot, (i.e. “The Den” could be an open learning space in the media center at a school with the “Grizzlies” mascot). Student opinions could be solicited through online polling instruments, a physical note-posting wall equipped with supplies for students to post ideas and thoughts, small group advisory discussions including mixed-ages with both adults and students, and open-form blogposts designed as community bulletin boards. Middle grade students could join facilitating teachers as blogmasters on the school sites, furthering the sense of shoulder-to-shoulder learning engagement.

With school choice a charged political topic, understanding particular private school models may assist policymakers and citizens in decisions about vouchers or government funding (Jessen & DiMartino, 2020; Potterton, 2020; Prieto et al., 2018; Shakeel & DeAngelis, 2018). As a result of studying MSs, policymakers are given the opportunity for more knowledgeable decision-making in implementing or funding innovative and effective school models (Roberts-Mahoney et al., 2016). Educators are compelled to develop effective school structures for citizens to obtain personal skills to navigate a changing world (Evans, 2018; Katzman & Horn, 2016). Charter and magnet school founders, innovative school designers, and pundits of school reform may use the MS structures described in the study to embed classrooms with elements more apt to instill motivation, choice, and competency in learners. The results may serve as evidence for larger schools and systems to secure resources through grant writing to fund the implementation of effective MS strategies in contained classroom settings within larger

constructs (Cohen, 2017). School choice lobbyists and policymakers may use the results of this study to advocate for fiscal backing, such as vouchers or tax benefit systems, and community support in the public arena to meet the unique needs of 21st-century learners.

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Appendix A

Permission for Image Use

Image 1

10/16/2019 Northwest Nazarene University Mail - Education Reimagined. Permission to use image.

Education Reimagined. Permission to use image.

1 message

Angela Bruggeman <abruggeman@nnu.edu>

Angela Bruggeman <abruggeman@nnu.edu> Sun, Oct 13, 2019 at 8:41 PM
To: monica@educationreimagined.org, general@educationreimagined.org

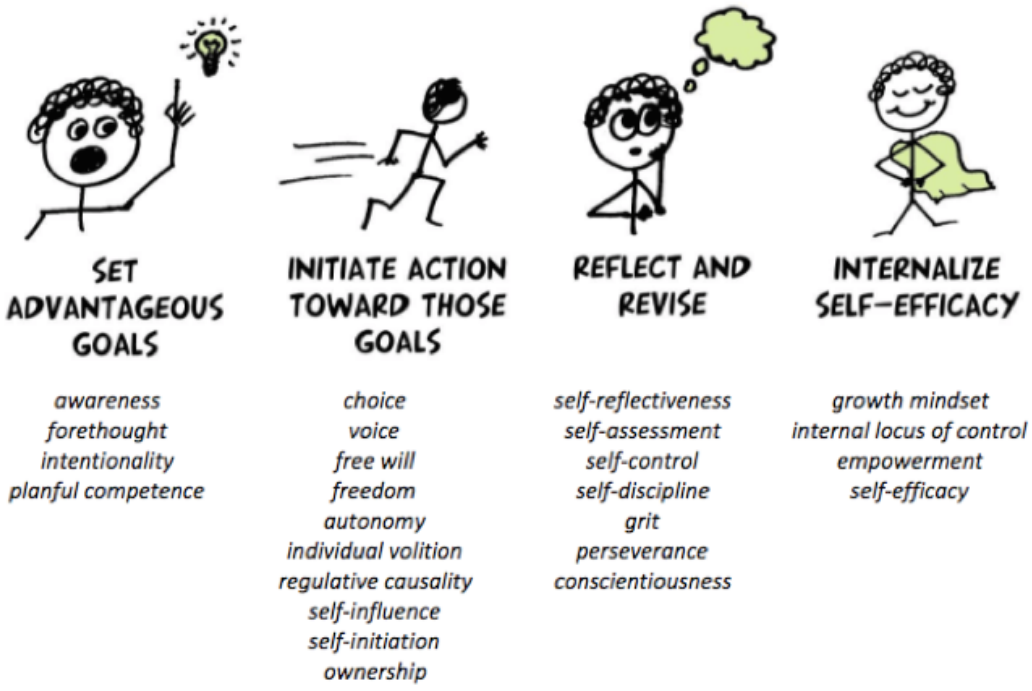
To whom it may concern,

I am a doctoral student at Northwest Nazarene University. I am writing a dissertation on micro-schools and the element of student agency.

I am writing for permission to use the image below in my dissertation. Please let me know how you would like me to reference the image as well.

I found this image in Jennifer Poon's writing:

Poon, J. D. (2018, September 18). Part 1: What do you mean when you say “student agency”? Retrieved from: https://education-reimagined.org/what-do-you-mean-when-you-say- student-agency/



https://mail.google.com/mail/u/2?ik=e1a8de49bb&view=pt&search=all&permthid=thread-a%3Ar-5631096875217033148&simpl=msg-a%3Ar-8895802796130... 1/1

10/16/2019 Northwest Nazarene University Mail - Request to Use Image

Request to Use Image

3 messages

Paul Haluszczak <paul@educationreimagined.org> To: abruggeman@nnu.edu Cc: Monica Snellings <monica@educationreimagined.org>

Hi Angela,

Angela Bruggeman <abruggeman@nnu.edu>

Tue, Oct 15, 2019 at 7:38 AM

We received your request to use the image in Jenny Poon's article. Since it belongs to Jenny, I will reach out to her and get back to you on the image's use.

Thank you for your patience, Paul--

Paul Haluszczak

Digital Content Manager Main Office (202) 830-2327 Cell (636) 577-4871

Facebook | Twitter | LinkedIn

Paul Haluszczak <paul@educationreimagined.org> To: abruggeman@nnu.edu Cc: Monica Snellings <monica@educationreimagined.org>

Tue, Oct 15, 2019 at 8:06 AM

Well, that was quick. Jenny gave the go ahead to use the image! I have attached the original file. Please let me know if you have any questions. Thanks, Paul

[Quoted text hidden]

Jenny Poon - Image 1.png

35K

Angela Bruggeman <abruggeman@nnu.edu> To: Paul Haluszczak

<paul@educationreimagined.org> Cc: Monica Snellings <monica@educationreimagined.org>

Tue, Oct 15, 2019 at 1:37 PM

https://mail.google.com/mail/u/2?ik=e1a8de49bb&view=pt&search=all&permthid=thread-f%3A1647470536263031092&simpl=msg-f%3A1647470536263031... 1/2

10/16/2019 Northwest Nazarene University Mail - Request to Use Image

Thank you so much! I appreciate this. Please thank Jenny for her approval.

Angela Bruggeman [Quoted text hidden]

https://mail.google.com/mail/u/2?ik=e1a8de49bb&view=pt&search=all&permthid=thread-f%3A1647470536263031092&simpl=msg-f%3A1647470536263031... 2/2

Appendix B

Informed Consent

Dear parent or guardian of a _____ School student,

I am a doctoral student at Northwest Nazarene University. I am conducting a timely study November 2020 to learn more about how school environments help students with independent learner skills. [name of] School leaders feel like this is an important study and have agreed to allow their students to participate as their perspectives could provide important information on this topic. We need to know if you are willing to participate as soon as possible.

Click here to give CONSENT for your child to participate in this timely research. Or keep reading to learn more.

For this research, your child's teacher or facilitator will ask your child to fill out a survey online for me and potentially participate in a small focus group discussion via Zoom to learn more about them as a learner. I will keep all answers private and anonymous, and responses will not affect students' grades or enrollment. Only people from my university working on the study with me will see them. No one should be able to identify which student voice is speaking.

We do not anticipate any negative impacts of this study. All students should feel free to answer the way they desire as there are not really any more right or more wrong answers.

I am doing this research to find out more about the effectiveness of your child's school. You and your child can feel good about helping me better understand how other schools and classrooms can benefit from knowing how you do things at [name of school].

You should know:

- Your child does not have to be in this study if you do not want them to.
- Your child may stop being in the study at any time. If there is a question they don't want to answer you can leave it blank.
- Even if you give consent, your child still has a choice whether or not to take part.
- You can ask any questions you have, now or later. If you think of a question later, contact me at *abruggeman@nnu.edu*

Click here to give CONSENT for your child to participate in this timely research.

Thank you for your consideration and quick response.

If interested, here is a video describing more about this study.

--
Angela L. Bruggeman
in cooperation with [name of] School Leadership
Attachments area

Appendix C

Parent Informational Letter

Dear Parent/Legal Guardian:

I am passionate about innovative educational models like the school your family has selected for your child to attend. I am an administrator at a Bay Area private school. In my own personal educational journey I have taught in many schools, both public and private, as well as overseas. I am eager to see the impact of new school models on learning. I am also a graduate student at Northwest Nazarene University, located in Nampa, Idaho and am currently pursuing a Ph.D. in Educational Leadership. I am presently in the research phase of the dissertation process, and see this as a fitting opportunity to combine my continued education with my passion.

Your child is enrolled in a private school. My study seeks to identify and explore student perceptions surrounding student agency with regard to motivation, choice, and competency with digitized learning. Your child's school has been selected to participate in this research study. However, in order to proceed with your child's participation, I need your consent.

Participating students will be asked to fill out a survey on a digital device, and possibly participate in a peer focus group to help me better understand student perspectives on the topics. I do not anticipate any harm to come from your child's participation in this study, and the study will not be a disruption to their educational process. The data collected from this study will be completely confidential and **will not** be used as a part of a school assessment. If for whatever reason you choose not to give your permission, no negative repercussions will occur for you or your child. The choice to participate, or not participate, has no bearing on your student's grades, permanent record, or status in school. If this becomes a published study, be assured that no personally identifying information about your child or their school will be disclosed.

I am excited to watch your child's school lead the way in innovations that may inform educational leaders and reformers. If you have any questions, or need any clarification, please do not hesitate to contact me, **Angela Bruggeman, by phone at (925) 560-6240 or email at abruggeman@nnu.edu**.

If you need further assistance please contact your school administrator.

My dissertation chair is also available to assist you. Dr. Amy Ackley, Ph.D., Faculty of Doctoral Education, Dissertation Chair, NNU at ackley@nnu.edu or (208) 467-8552

Sincerely,
Angela Bruggeman
NNU Ph.D. Doctoral Student

THE NORTHWEST NAZARENE UNIVERSITY HUMAN RESEARCH COMMITTEE HAS REVIEWED THIS PROJECT FOR THE PROTECTION OF HUMAN PARTICIPANTS IN RESEARCH.

Appendix D

Minor's Assent

NORTHWEST
NAZARENE UNIVERSITY

Hello,

Welcome to my student survey. I am conducting research to discover how students in your age group feel about school and learning. You have the opportunity to take this survey because your parents gave me permission to ask you to participate.

Your school has agreed to be part of this study to help educators across our country, or even the world, better understand how students today experience school. This online survey is completely anonymous and confidential. That means no one will know which answers you select as an individual and all of your individual answers will be kept a secret from everyone, except me and the research team.

There is no grade for completing this survey and you can stop at any time. This activity will take you about 20 -30 minutes to complete, maybe less. You have to option to participate or not.

If you'd like to give me your opinions, please click on the arrow and begin the survey on the next screen.

Appendix E

Student Survey Questions

Total 32 items

Directions: Read each item carefully. Please mark the answer from "strongly agree" to "strongly disagree" that best describes how you feel about your school and learning.

1- strongly agree, 2 – agree, 3- somewhat agree, 4- disagree, 5- strongly disagree.

Motivation (11 items)
I do an assignment during class because I think the activity is interesting.
I do an assignment during class because I think I am supposed to do it.
I do an assignment during class because I think the activity is good for me.
I do an assignment during class because I want to.
I do an assignment during class because I don't have a choice.
I do an assignment during class because I feel good when doing the activity.
I like the feeling of finishing any assignment I begin.
It is important for me to be a hard worker with school work.
I continue steadily toward my goals.
I don't give up easily.
In my classes, I find learning to be enjoyable.

Choice (7 items)
I have opportunities to choose what instructional materials, such as books or computer applications, I use in class.
I work on different topics or skills than what my classmates are working on at the same time.
I am given the chance to work through instructional materials at a faster or slower pace than other students in my class.
My opinions are respected in this school.
I can be creative in classroom assignments and projects.
I am comfortable being myself at this school.
If I could choose a school right now, it would be this school.

Competency (14 items)
It is important to me that I learn a lot of new concepts this year.
One of my goals in school is to learn as much as I can.
It's important to me that I completely understand my schoolwork.
When I am working on an assignment or activity, I know the goals of what that assignment or activity are.
I keep track of my learning progress by using technology (for example, I view an online grade book or use a portfolio).
I have opportunities to review or practice new material until I really understand it.
I'm certain I can master the skills taught in school this year.
I have confidence I can figure out how to do the most challenging school assignments.

I can do almost all the work assigned in school if I don't give up.
Even if the work is hard, I can learn it.
Before I begin working on an assignment, I think about the things I will need to do to complete that assignment.
I use what I've learned from previous assignments and what I have learned in school to do new assignments.
I can apply what I learn in class to real-life situations.
When I'm learning something new, I try to connect the things I'm learning about with what I already know.

Adapted from these validated instruments: (permission sought and obtained)

SIMS

Guay, F., Vallerand, R. J., & Blanchard, C. (2000). On the assessment of situational intrinsic and extrinsic motivation: The situational motivation scale (sims). *Motivation and Emotion, 24*(3), 175-213. doi: 10.1023/A:1005614228250

Personalized Learning Student Survey

Pane, J.F., Steiner, E.D., Baird, M.D., Hamilton, L.S., Pane, J.D. (2015). Informing progress—personalized learning: Teacher and student survey results. (Addendum Report). *Rand Corporation*. Retrieved from https://www.rand.org/content/dam/rand/pubs/research_reports/RR2000/RR2042/RAND_RR2042z1.pdf

Appendix F

Semi-Structured Focus Group Protocol

(Original, unrevised. Revised protocol on following page.)

Purpose

- To extend the understanding of quantitative findings of students' perceptions of:
    - a sense of agency, or autonomy in the school setting
    - level of motivation in a micro-school environment
    - choice in the micro-school class setting
    - competency and ability to accomplish learning tasks with personalized learning platforms.

Setting Up the Focus Group

- Contact lead administrator and classroom teacher at participating school. Set up date, time, and location in school for video-conference focus group. Provide student list and consent/assent forms for focus group participants. Confirm that all participating classrooms from site are represented within selected focus group participants.
- Provide the following information to site contact:
    - Location for focus group needs to hold facilitator, plus three to five students.
    - Focus group should last approx. 1 hour.
    - Consent/Assent forms for participating students confirmed in Qualtrics

Things for the Facilitator to Bring to Focus Group

- Laptop for recording of focus group session.
- Signed consent/assent forms (parent must sign beforehand if student is under age 18)
- Focus group protocol

Conducting the Focus Group

1. As students arrive, have ask for each to label their screen name to their actual name.
2. Introduce myself as students arrive and let them know we will get started once everyone has arrived.
3. Once everyone has arrived:

Hello, everyone!

I'm so thankful you are able to participating in this focus group today. Our time together should last no more than hour. My name is Angela Bruggeman. I have taught many grades, including 5^{th} – 8^{th} grade. I am now a leader at a private school and also, I am a student just like you. This time today is helpful for me as I work to earn a doctoral degree in education. That will make me

a doctor of education. As a part of my formal research I need to hear your opinions on how you feel about learning at your school. This is called a focus group.

You may be wondering, What is a focus group? A focus group is a group discussion where I gather your opinions. I will record and write down the things you say. Participants in focus groups usually have something in common. In your case, you were selected because you completed the student survey portion of this study, you attend this school, and you are willing to share your ideas and opinions with me. Otherwise, you were selected randomly. My goal for this group is to hear from you about how your experiences as a student in this school, and how you feel about being motivated as a learner, how it feels to you when you get to make choices as a student, and in general your ideas about being a learner at this school.

I want you to know in this conversation there are no right or wrong answers. We do not need to all to agree with each other. It is okay if some of you have different opinions or ideas. I will be asking questions that will help us stay focused in our conversation. I also want you know it is okay if someone says something that gives you an idea of a comment to make on the topic. In fact, I encourage you to comment on each other's ideas. Also, I do ask is that we try our very best to only speak one person at a time. Wait for each person to finish their thoughts before sharing new comments.

I will be recording our conversation today, partly because I can't possibly write down everything you say. The recording is my note taking system. It will make sure that I report your opinions accurately. This interview recording will not be shared with anyone at your school. I will be using this information to write a report. I may even use quotes from this focus group, but I will not use your name in my report. I want to remind you that your participation is this group is completely voluntary. Although you have all shown interest in participating in this group by being here, you are free to not answer specific questions. Also, you are free to leave at any time.

4. Start recording: Ask each student to introduce themselves.

Sample Focus Group Questions

As per explanatory sequential design, quantitative research will act as a catalyst for the study's first stage of inquiry. These qualitative semi-structured focus groups will offer depth of information to a study's questions that numerical data may not. The following questions are sample questions of what could be included in the focus group protocol. The final focus group protocol will not be finalized until analysis of quantitative data is completed.

Questions-Introductory:

1. What is special about your school?

2. What parts of your school experience do you think help you learn?

Questions- General Topic:

1. What are things about this school that motivate you to be a good student?
2. Are there things about this school that cause you to feel unmotivated as a learner? Can you give me an example of a time this happened?
3. How much choice do you feel students should have in the learning process?
4. How do you feel about having electronic devices to do online learning?

Questions- Depth & Detail:

1. Can you give an example of when you feel most motivated to participate in schoolwork?
2. Do you feel this school has a motivating environment? Why is that?
3. Do you feel it is important for students to take responsibility for their own learning in classroom? Do you take this responsibility?
4. How do you feel when you have opportunities to make choices about your learning?
5. When you are able to pick for yourself how you will complete an assignment, do you think that will help you learn better? Tell me more about this.
6. How often do you use digital devices as part of your learning each week/day? How often do you think electronic devices should be part of the classroom experience? Can you give me an example of the best use of devices for you as a student?
7. Is there anything else any of you would like to share about your experience at this school? (follow up on ideas for clarity)

Thank you so much for participating in our study today.

ABruggeman Dissertation Semi-Structured Focus Group Protocol
(Revised after pilot)

Purpose
• To extend the understanding of quantitative findings of students' perceptions of: o a sense of agency, or autonomy in the school setting o level of motivation in a micro-school environment o choice in the micro-school class setting o competency and ability to accomplish learning tasks with personalized learning platforms.

Setting Up the Focus Group

- Contact lead administrator and classroom teacher at participating school. Set up date, time, and location in school for site-based focus group. Provide student list and consent/assent forms for focus group participants. Confirm that all participating classrooms from site are represented within selected focus group participants.
- Provide the following information to site contact:
  - Location for focus group needs to hold facilitator, plus four to six students.
  - Focus group should last approx. 1 hour.
  - Students will receive a healthy snack when participating in focus group. (Possible example: fruit, veggies, whole grain crackers, etc.)
  - Consent/Assent forms for participating students

Things for the Facilitator to Bring to Focus Group

- Smartphone for recording of focus group session.
- Zoom account set up for recording.
- Signed consent/assent forms (parent must sign beforehand if student is under age 18)
- Focus group protocol

Conducting the Focus Group

Introduce myself as students arrive on Zoom and let them know we will get started once everyone has arrived.
Once all students have arrived:

Hello, everyone!

I'm so thankful you are able to participate in this discussion today. Our time together should last no more than 35 or 40 minutes. My name is Angela Bruggeman. I have taught many grades, including upper elementary and middle school grades. I am a student just like you. I am studying how middle grades students, like you, feel about school and learning.

I am excited to hear your opinions in today's group discussion. I will record and write down the things you say. My goal for this time today is to hear from you about how your experiences as a student in this school, and how you feel about being motivated as a learner, how it feels to you when you get to make choices as a student, and in general your ideas about being a learner in the 21st century.

I want you to know in this conversation there are no right or wrong answers. We do not need to all to agree. It is okay if some of you have different opinions or ideas. I will be asking questions that will help us stay focused in our conversation. I also want you know it is okay if someone says something that gives you an idea of a comment to make on the topic. In fact, I encourage

you to comment on each other's ideas. Also, I do ask is that we try our very best to only speak one person at a time. Wait for each person to finish their thoughts before sharing new comments.

I will be recording our conversation today, partly because I can't possibly write down everything you say. The recording is my note taking system. It will make sure that I report your opinions accurately. This interview recording will not be shared with anyone at your school. I will be using this information to write a report. I may even use quotes from this focus group, but I will not use your real name in my report. I want to remind you that your participation is this group is completely voluntary. You are free to not answer any specific questions. And, you are free to leave at any time.

Start recording: Ask each student to introduce themselves.

Sample Focus Group Questions

As per explanatory sequential design, quantitative research will act as a catalyst for the study's first stage of inquiry. These qualitative semi-structured focus groups will offer depth of information to a study's questions that numerical data may not. The following questions are sample questions of what could be included in the focus group protocol. The final focus group protocol will not be finalized until analysis of quantitative data is completed.

Questions-Introductory:

1. Let's start with hearing ideas from a few of you, tell me what makes your school a special place.

Questions- Motivation:

2. What are things that happen in your lessons or classes that motivate you to be a good student? Can you give me an example of a time this happened?

3. When do you feel most motivated to participate in school lessons or activities?

4. Are there any things about this school that cause you to feel unmotivated as a learner?

Questions- Choice:

5. What do you think about students having a choice in determining *what* they learn at school or *how* they learn at school?

6. How does it make you feel when you have opportunities to make choices about your learning? When you are able to pick for yourself how you will complete an assignment, do you think that helps you learn better? Tell me more about this.

Questions- Competency:

7. Give me a few examples of the best use of e-devices, like computers or tablets, for you as a student?

8. Does technology in the classroom help you learn at your own pace? Tell me what this looks like for you?

9. Does technology in the classroom help you go deeper in your learning? Tell me what this looks like for you?

10. Is using technology in the classroom good, bad, or neutral? Tell me you feel this way.

Questions - General

11. Is there anything else any of you would like to share about your experience at this school? (follow up on ideas for clarity)

Thank you so much for participating in our study today. Have a great day!

Appendix G

Micro-school Site Selection Checklist

Checklist A – Website information

___ non-public school

___ student body < 150

___ educational technology access

___ open classroom layout

___ student-centered philosophy

Checklist B – Phone call information

___ confirm elements of Checklist A are met

___ educate students ages 8 -14

___ mixed-ages in same learning space

___ open administrators

___ percentage of core instruction via digital platform > 30%

Appendix H

CVI Table

Content Validity Index on Student Agency Questionnaire

BRUGGEMAN SURVEY CONTENT VALIDITY INDEX											
N/A = NO ANSWER LEVEL 3 OR 4 Agreement of Relevance = R LEVEL 2 OR 1 Agreement of Relevance = X											9/9=100% 8/9= 88.8% 7/9= 78% 6/9= 67%
	EXPERT 1	EXPERT 2	EXPERT 3	EXPERT 4	EXPERT 5	EXPERT 6	EXPERT 7	EXPERT 8	EXPERT 9	# IN AGREEMENT	ITEM CVI
Topic/Prompt	EY	AH	RH	GS	SH	CUH	JL	KG	LL	Out of 9	
Perception of Student Agency											
During class, I ask questions.	R	R	X	R	R	R	R	R	R	8	88.80%
I tell the teacher what I like and what I don't like.	R	X	R	X	R	X	R	X	R	6	67.00%
I let my teacher know what I 'm interested in.	R	R	R	R	R	R	R	X	R	8	88.80%
During class, I express my preferences and opinions.	R	R	X	R	R	R	R	R	R	8	88.80%
I offer suggestions about how to make the class better.	R	R	X	R	R	R	X	R	R	7	78.00%
								TOTAL APPROVED PROMPTS = 3			
Level of Motivation											
I do an assignment during class because I think the activity is interesting.	X	R	R	R	R	R	R	R	R	8	88.80%
I do an assignment during class because I think I am supposed to do it.	R	R	R	N/A	R	R	R	R	R	8/8	100%
I do an assignment during class because I think the activity is good for me.	R	R	R	R	R	R	R	R	R	9	100%
I do an assignment during class but I am not sure if it is worth it.	X	R	R	R	R	R	X	X	R	6	67%
I do an assignment during class by personal decision.	X	R	R	R	X	R	R	R	R	7	78%
I do an assignment during class because I don't have any choice.	R	R	R	R	R	R	X	R	R	8	88.80%
I do an assignment during class because I feel good when doing the activity.	X	R	R	R	R	R	R	R	R	8	88.80%
I don't know why I do an assignment during class; I don't see what this activity brings me.	X	N/A	R	X	R	R	R	R	R	6/8	75%
I finish whatever I begin.	R	R	R	X	R	R	R	X	R	7	78%
I am a hard worker.	X	R	R	R	R	R	R	X	R	7	78%
I continue steadily toward my goals.	R	R	R	R	R	R	R	R	X	8	88.80%
I don't give up easily.	R	R	R	R	R	R	R	X	R	8	88.80%
The material I am learning in my classes is interesting.	R	X	R	X	R	R	X	R	R	6	67%
I like the way we learn in my classes.	R	X	R	R	R	R	X	R	R	7	78%
In my classes, learning is enjoyable.	X	X	R	R	X	R	R	R	R	7	78%
								TOTAL APPROVED PROMPTS = 8			

Perception of Choice											
I have opportunities to chose what instructional materials (such as books or computer software) I use in class.	R	X	R	R	R	R	R	R	R	8	88.80%
I have opportunities to chose what topics I focus on in class.	R	X	R	X	R	R	R	R	R	7	78.00%
I work on different topics or skills than what my classmates are working on at the same time.	R	X	R	R	R	R	R	R	R	8	88.80%
I am given the chance to work through instructional material at a faster or slower pace than other students in my class.	R	X	R	R	R	R	R	R	R	8	88.80%
My opinions are respected in this school.	R	R	R	R	R	R	R	R	R	9	100.00%
I can be creative in classroom assignments and projects.	R	R	R	R	R	R	R	R	R	9	100.00%
I am comfortable being myself at this school.	R	R	X	R	R	R	R	R	R	8	88.80%
I am an important part of my school community.	R	R	X	R	X	R	R	X	R	6	67.00%
If I could choose a school right now, I would choose this school.	R	R	X	R	R	R	R	R	R	8	88.80%
								TOTAL APPROVED PROMPTS = 7			
Sense of Competency											
It's important to me that I learn a lot of new concepts this year.	R	R	R	R	R	R	R	X	R	8	88.80%
One of my goals in school is to learn as much as I can.	R	R	R	R	R	R	R	R	R	9	100%
One of my goals is to master a lot of new skills this year.	R	R	R	R	R	R	R	R	X	8	88.80%
It's important to me that I thoroughly understand my schoolwork.	R	R	R	R	R	R	R	R	R	9	100%
I am required to show that I understand a topic before I move on to a new topic.	R	X	R	X	R	R	R	X	R	6	67%
When I am working on an assignment or activity I know the goals of what that assignment or activity are.	R	R	X	R	R	R	R	R	R	8	88.80%
I keep track of my learning progress by using technology (for example, using an online grade book or portfolio).	R	X	R	R	R	R	R	R	R	8	88.80%
If I have trouble understanding the material when I'm using technology, I am able to get help quickly.	R	X	X	X	R	R	R	X	R	5	56%
I have opportunities to review or practice new material until I really understand it.	R	R	R	R	R	R	R	R	R	9	100%
I'm certain I can master the skills taught in school this year.	R	R	R	R	R	R	R	R	R	9	100.00%
I'm certain I can figure out how to do the most difficult schoolwork.	X	R	R	R	R	R	R	X	R	7	78.00%
I can do almost all the work in school if I don't give up.	R	R	R	R	R	R	R	X	R	8	88.80%
Even if the work is hard, I can learn it.	R	R	R	R	R	R	R	R	R	9	100.00%
Before I begin working on an assignment, I think about the things I will need to do to complete that assignment.	R	R	R	R	R	R	R	R	R	9	100.00%

I use what I have learned from previous assignments and what I have learned in school to do new assignments .	R	R	R	R	R	R	R	X	R	8	88.80%
When I am studying a topic, I try to make everything fit together.	R	R	R	X	R	R	X	R	R	7	78.00%
When I'm learning something new, I try to connect the things I'm learning about with what I already know.	R	R	R	R	R	X	R	R	R	8	88.80%
								TOTAL APPROVED PROMPTS = 13			

Appendix I

Survey Instructions

[video script, in lieu of live teacher instructions]

Hello,

Welcome to my research activity. My name is Angela. Like you, I am a student. I am doing a research project to discover more about how students in your age group feel about school and learning. Thank you for taking the time to listen as I tell you about this activity.

Your school leaders and parents gave permission for your ideas to be a part of this study. Your opinions are important. In fact, your opinions are the most important part of this research project. Today you have the opportunity to help me. Your teacher has given you access to a digital survey. The survey will probably take you about 15 - 20 minutes or so to complete.

At the beginning of the survey, you have a chance yourself to agree to participate, by clicking the red arrow at the bottom of the first screen. Or, you can choose to not participate. Do not click the arrow and sit quietly until the group is done.

After clicking the arrow to being, the instructions are on the screen. Once the survey begins, you will see statements about school. Read each item carefully. Please mark the answer from "strongly agree" to "strongly disagree" that best describes how you feel about your school and learning.

I've had other students your age group take this survey before. So, it should probably make sense to you. If you get stuck on a particular word you can ask your teacher for help. Or, you can make a choice based on what you think it means and then move on to the next question.

When you are done, simply press the submit button and let your teacher know you are finished. Thank you, again, for your help today. I'm excited to learn more about how students at your school feel about learning. Have fun!

Link to video script here:
https://drive.google.com/file/d/1fnBkcWilIu5x5o9NK8OTZ_r5effTF0bC/view

[teacher script, in lieu of video]

Hello,

Welcome to *this* research activity. *Our school is working with a researcher who*, like you, *is* a student. *She is* doing a research project to discover more about how students in your age group

feel about school and learning. Thank you for taking the time to listen as I tell you about this activity.

Your school leaders and parents *have given* permission for your ideas to be a part of this study. Your opinions are important. In fact, your opinions are the most important part of this research project. Today you have the opportunity *to contribute to this research*. *I have* given you access to a digital survey. The survey will probably take you about 15 - 20 minutes or so to complete.

At the beginning of the survey, you have a chance yourself to agree to participate, by clicking the red arrow at the bottom of the first screen. Or, you can choose to not participate. Do not click the arrow and sit quietly until the group is done.

After clicking the arrow to being, the instructions are on the screen. Once the survey begins, you will see statements about school. Read each item carefully. Please mark the answer from "strongly agree" to "strongly disagree" that best describes how you feel about your school and learning.

Other students *in* your age group *have taken* this survey before. So, it should probably make sense to you. If you get stuck on a particular word, you can ask *me* for help. Or, you can make a choice based on what you think it means and then move on to the next question.

When you are done, simply press the submit button and let *me* know you are finished. Thank you, again, for your help today. *It is exciting* to learn more about how students *in your age group* feel about learning. Have fun!

Appendix J

National Institute of Health (NIH) Certification

Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **Angela Bruggeman** successfully completed the NIH Web-based training course "Protecting Human Research Participants".

Date of completion: 03/17/2018.

Certification Number: 2681411.