Shifting Modalities: Providing K-5 Montessori Education Online during the Pandemic

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Abstract

At the first and only public Montessori charter school in New York City, teachers create learning environments, materials, and lessons that help students guide themselves to find information needed to arrive at a necessary learning outcome. The sudden shift to online instruction in March 2020 required parents, teachers, and administration to maintain business-as-usual in an unfamiliar modality—online instruction. This case study reflection article focuses on the planning strategies identified and implemented that shifted the school to teaching and learning online during the COVID-19 pandemic while working to keep the Montessori philosophy alive, despite the expansion to the online modality. Existing research, the process of shifting to the online modality, maintenance of the Montessori approach, and the inter-institutional support provided to the charter school by a community college are reviewed.

Once mandated to move to online instruction, strategies employed show that maintaining students' natural desire to learn and active discovery are central objectives in tandem with supporting the relationship-centered culture in the machine-oriented online-learning environment. This dual focus is critical because children's development is maximized when they are engaged in secure, mutually collegial relationships (Greenfield & Suzuki, 1998).

It was concluded that building community among children and teachers, as well as between administration, teachers, families, and a partnering community college were valued and deemed critical to sustaining the rigorous curriculum and relationship-based school culture during the pandemic crisis.

Keywords

online education, Montessori, pandemic, cross-disciplinary, transparency

Introduction

In the field of education, primary schools are embracing digital tools and advancing electronic and virtual spaces for learning with the onset of high-tech inventions (Thibaut et al., 2015). Shifting to online technology outside the traditional classroom space is influencing how teaching and learning are conducted (Thibaut et al., 2015). One can

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presume that this impact on teaching and learning is an outcome of modern-day activities where technology usage is prevalent (Thibaut et al., 2015). Garrison (2009) concludes that there are two major methods used in online learning. In the first method, devices and procedures to access and categorize information is offered to individuals to maintain the practices that optimize the independence of learners in existing distance education models (Garrison, 2009). In the second method, the online learning context is used more fully to optimize the potential of online learning to design focused query communities that are grounded in collaborative, two-way constructivist beliefs (Garrison, 2009).

This case-study reflection article focuses on the planning strategies identified and implemented by the New York City Montessori Charter School (NYCMCS) in its shift to the online modality for teaching and learning during the unprecedented COVID-19 pandemic. The NYCMCS found success with online teaching and learning while keeping the Montessori philosophy alive, despite the expansion to the online modality. In this shift to online education, the NYCMCS leadership team sought to merge the philosophical differences of the traditional measures of school success with Montessori education using community and instructional delivery, all of which are reliant on a clear structuring of the classroom environment and the ways that teachers and students connect (D. Cummings-Clay, personal communication, April 1, 2020). As the transition to online learning progressed, the methods espoused by Garrison (2009) informed the development of the online design.

Traditionally, in a Montessori school, the Montessori Method promotes precise, self-motivated growth for children in the cognitive, emotional, social, and physical realms (American Montessori Society [AMS], 2019). The model itself is largely based on two basic philosophical goals:

1. Students and adults engage in psychological self-construction by means of interaction within the learning environment.

2. Adults serve as guides in the learning space (AMS, 2019).

In the United States, there are several states where students in public Montessori schools are permitted a very authentic Montessori education (AMS, 2019). In the New York charter sector, however, this is more complex. The measures of school success draw on test scores and sub-group proficiency as the major determining factors for school renewal, which is in direct conflict with the Montessori concept that students can develop at their own pace as their interest guides them.

The NYCMCS is the first and only public Montessori school in NYC. Its goals are structured a little differently than traditional Montessori schools. At NYCMCS, the leadership has taken the stance that the school operates philosophically from a place of being a Montessori school while only exercising the practice of Montessori education on a gradient that goes from *more Montessori* to *more traditional* as the students matriculate into the higher grades. The major reason for this is the lack of accessibility to progressive schools in middle and high school for the students served in the school.

Review of Literature

Child Development

Early childhood is a time during which children learn through a variety of active

encounters and experiences, where their social and emotional growth is linked to cognitive development that varies and is influenced by the sociocultural environments of children (Souto-Manning et al., 2019). One concept, prevalent for children, is that they have an innate desire to learn (Souto-Manning et al., 2019). Jean Jacques Rousseau espoused that early childhood was a specific time in the 18th century and Frederick Froebel endorsed the idea in the 19th century when he founded the first kindergarten (Souto-Manning et al., 2019). This concept was key along with the notion that learning is driven by children's interests and inner incentive and that they learn via active discovery (Souto-Manning et al., 2019).

Another concept is that sociocultural contexts affect learning (Souto-Manning et al., 2019). Children learn with the help of others who are more educated and/or experienced in acquiring intellectual and emotional tools to grow in advanced thinking and behavior (Souto-Manning et al., 2019). Furthermore, a concept pertinent to children's development is caring and reciprocal relationships along with the connection among emotions and cognition (Souto-Manning et al., 2019). This ensures that when there is a trust network in which relationships are reciprocal, the growth and development of children is optimized (Greenfield & Suzuki, 1998; Souto-Manning et al., 2019).

The architecture of early childhood is shifting to add to these concepts the inclusivity of the cultural traditions of people of color who have been minoritized via culturally responsive teaching (CRT) and culturally relevant pedagogy (CRP) (Souto-Manning et al., 2019). CRT focuses on employing the characteristics, perspectives, and experiences in a culture of ethnically varied students as channels for teaching them well (Gay, 2002; Souto-Manning et al., 2019). The idea is to unite learning outcomes in the school to life in the environment outside of school; promote equity and quality in education; build kinship among people from diverse cultural, social, and ethnic circumstances; and expand students' activities, effectiveness, and sense of confidence (Gay, 2013; Souto-Manning et al., 2019). CRP is a framework incorporating principles that students must experience academic success, develop and/or maintain cultural competence, and develop a critical consciousness in which they are inspired to challenge the current situation of society (Ladson-Billings, 1995; Souto-Manning et al., 2019).

Although the research on childhood development informs the practice of teachers who engage students in on-site classroom settings in brick-and-mortar schools, it is also useful for teachers who teach children in other modalities. The same foundational concepts are common for online teaching and learning settings. Additional standards and principles must be embraced when constructing teaching and learning experiences in these other modalities.

Online Learning Interaction and Support Frameworks

There are two frameworks, used in higher education, that are especially pertinent to K-12 online learning support because student interactions are at their core (Borup et al., 2019). The first framework is based upon the Theory of Transactional Distance while the second framework uses social constructivist principles and is based upon the Community of Inquiry (CoI) framework (Borup et al., 2019).

The proponent of the Theory of Transactional Distance, Moore (1980), defined the term dialogue as shared exchange between a

learner and instructor for which the instructor facilitates in a distance-education setting. He also described structure as the "extent to which learning objectives, procedures, and assessments are planned and cannot be easily adapted to students' needs" (Borup et al., 2019, p. 255). In this framework, the degrees of dialogue and structure regulate the learner's transactional distance as termed by Moore (Borup et al., 2019). For example, in courses with high levels of dialogue and low structure, the transactional distance is lower whereas the transactional distance is higher in courses with lower amounts of dialogue and high structure (Borup et al., 2019). Moreover, Borup et al. proposed that "the ability to decide 'what to learn, how to learn, and how much to learn'"- the instructor's examination of learner autonomy - is vital as "the greater the transactional distance the more the learners have to exercise autonomy" (2019, p. 255).

It is critical to note that there is a difference between distance education and online learning. An industrial model of distance education, espoused by Otto Peters, posed a concept of differentiating distance education from traditional higher education (Garrison, 2009). From a historical perspective, correspondence study progressed into a mechanized course or activity, according to distance-education researchers of the 1990s (Garrison, 2009). Specifically, the focus of distance education is on principles of independence, autonomy, and self-pacing (Garrison, 2009).

In contrast, the focus of online learning is on principles of collaborative constructivist approaches (Garrison, 2009). In the CoI framework, social presence is espoused as a theory (Borup et al., 2019). Social presence is defined as "the ability of participants . . . to project their personal characteristics into the community, thereby presenting themselves to the other participants as 'real people'" (Garrison et al., 2000, p. 89). Actual communication behaviors are stressed above the volume of interactions (Borup et al., 2019). Moreover, social presence can impact a student's cognitive presence "because it allows for the meaningful and sustained communications that is required to co-construct knowledge of the course material" (Borup et al., 2019, p. 255).

Furthermore, social presence and cognitive presence are unable to reach adequate levels without teaching presence, which Garrison and other proponents believe to be the glue of the framework (Garrison et al., 2000). Teaching presence is created through the instructional design and its organization. For example, how the curriculum is set, planning methods, time boundaries, technology choices, and forming netiquette (Anderson et al., 2001). Moreover, teaching presence surfaces when online discussions are facilitated via pinpointing areas of harmony, consensus pursuits, highlighting student contributions, creating an open-learning climate, etc. (Anderson et al., 2001). Finally, direct instruction is personified through presenting content, recapping discussions, detecting errors, and giving feedback (Anderson et al., 2001). Social presence for NYCMCS teachers is implemented in online lessons through video transmissions to students, classroom discussions, and direct instruction.

With respect to this case study, distance education refers to when the child does independent study at home with physical materials provided by the school and limited direct instruction. Online learning, in contrast, is direct instruction delivered by the classroom teacher, where students are monitored for the full school day, and all resources and materials are digital. Thus, in this case study, distance education did not allow the teacher to monitor

growth in the same way as in a physical classroom in the first phase of online learning since the teacher only met with the individual child for 15 minutes each day. However, when children met online in Google Classroom in the second phase for varying time amounts and when they followed their previous on-site schedule as a class in the online modality in the third phase, examining growth was enabled.

K-12 Online Learning

The effectiveness of K-12 online learning can be measured by ensuring that specific components are included. Examples of items to include are academic and technology standards, effective course technology that mirrors an engaging classroom space, learner interaction/ engagement, and learner support/feedback.

Standards, reflecting best practices that include features of course blueprints, are available within the K-12 online learning setting (Adelstein & Barbour, 2017). For example, the International Association for K-12 Online Learning (iNACOL) issued National Standards for Quality Online Standards in 2011 (Adelstein & Barbour, 2017). Other institutions employ Quality Matters (QM) standards, which are a segment of a branded method (Adelstein & Barbour, 2017). QM developed a rubric in 2004 that evolved into a process for review of online courses based upon eight benchmarks: course overview and introduction, learning objectives, assessment and measurement, instructional materials, learner interaction and engagement, course technology, learner support, and accessibility (Adelstein & Barbour, 2017).

A case study of physical and online spaces in a blended primary classroom was instructive here. In the study, an online space was comprised of a Learning Management System (LMS), social network site (SNS), and a Wi-Fi network, which was supported by a policy regarding student laptops and email accounts for students (Thibaut et al., 2015). Sheltered in the LMS was information, a storehouse for announcements, schedules, policies, etc. and resources related to learning activities (Thibaut et al., 2015). Students, teachers, and parents could interface with the system differently, with each able to connect to pertinent learning resources and the curriculum (Thibaut et al., 2015). Online spaces also included locations (i.e., homes, library, etc.) where students used laptops/computers to enter the LMS, SNS, or email accounts (Thibaut et al., 2015). "Those portals, accessible anytime and anywhere, enabled students to participate and follow up the online learning activities outside of the classroom" (Thibaut et al., 2015, p. 466).

Moreover, this online space is helpful to teachers. The space enables teachers to disseminate knowledge to various stakeholders, convey instructions and content-related materials to students, and distribute teachers' resources in multiple methods, not limited to word documents, audio files, and video files (Thibaut et al., 2015). As in the traditional classroom, the online space empowers the role of teachers as the ones in charge of managing the online environment and the knowledge delivery processes (Thibaut et al., 2015). Empowerment of the teacher's provision of a social presence in this online space supports the CoI framework as it can impact a student's cognitive presence since it fosters purposeful and constant communications among the teacher and child, which is required to help children learn course content (Borup et al., 2019).

In a case study of a web-based course in primary care, an example of how a collaborative learning experience in the online setting was

initiated started with its integration in each study unit with connection to and serving as the base for the students' assessment in their course (Russell, et al., 2006). In a virtual teacher-facilitated session (Russell, et al., 2006):

> The seminar becomes an opportunity for students to present initial ideas, focus, reflect upon, and refine their ideas for their assignments. Through online discussion, the students can actively construct knowledge. They can practice and develop their higher order academic skills. They share and learn from each other's experiences and perspectives, and they get exposure to different approaches to problem solving and learning. They give informal feedback, providing an opportunity for peer assessment (p. 472).

The online vehicle is beneficial as a device for providing support to learners and/or offering feedback (Russell et al., 2006). Feedback has an affirmative effect on student learning that is more than other facets of teaching or intervention intended to enrich learning (Gibbs & Simpson, 2004). Some of the conditions under which feedback supports learning include that the feedback focuses on the students' performance, on their learning and on actions under the students' control, that it is given in a timely manner, that it is appropriate to the assignment's purpose, and that it is acted upon by the students (Gibbs & Simpson, 2004; Russell et al., 2006).

The Montessori Philosophy and Online Instruction

The Montessori philosophy is based on respect for the child (Calvin-Campbell, 1998). A major premise is that the child performs best when part of a setting where they can grow easily (Montessori, 1988). Maria Montessori, who was the first woman in Italy to receive a Doctor of Medicine degree and who ultimately used her scientific skills of observation to discover how to teach young children, created an environment for children in which they could choose their own work throughout the day (Calvin-Campbell, 1998). Montessori believed that learning encompassed the complete child, linking the movements learned in everyday life and the aptitudes cultivated with sensorial materials (Calvin-Campbell, 1998).

Thus, two main areas in the Montessori curriculum are worth mentioning. The first area focuses on movement education in everyday life (Massello-Chiacos, 1996). Examples include tasks like dressing, cleaning, cooking, and polishing (Calvin-Campbell, 1998). Children are prepared to write by movements such as twisting lids, pouring, and tweezing (Calvin-Campbell, 1998). The child's hands and arms are strengthened, coordination is enhanced, and language is an extension of this area (Calvin-Campbell, 1998).

The second focuses on the sensorial area whereby children explore and learn to use the sound, sight, smell, taste, and touch senses. A child's development in these areas when young will advance their prospects to explore ceaselessly (Calvin-Campbell, 1998). Moreover, the tactile sense is used in this area. For example, textured letters and numbers are used to help children learn to write (Calvin-Campbell, 1998). Children use their fingers to trace the rough outlines of the symbols as well as use their hands and eyes to learn proportion (Calvin-Campbell, 1998). In this sensorial area, mathematics is an innate expansion (Calvin-Campbell, 1998).

Three different epistemologies are reflected in the educational practice of Montessori. The first is Nativism where

Montessori conceives of children growing in sensitive periods and recognizing that children have their own ways of approaching their surroundings (Elkind, 2003). This can be thought of as a learning process whereby film is loaded onto a projector to project images on a screen (i.e., the world) that is blank (Elkind, 2003). The second epistemology is Empiricism whereby Montessori emphasizes the inductive nature of imagination and generalizations are used to go from the specific to the broad (Elkind, 2003). The viewpoint here is that the world exists separately from our mind, and we learn about it essentially by photographing it with our senses that function like a camera with unused film (i.e., our memory) that gets exposed as we feel, look, listen, taste, and touch our surroundings (Elkind, 2003). The third epistemology is Constructivism in which Montessori describes a child's interpretation and transformation of the world through their own activity (Elkind, 2003). It is noteworthy that the Montessori philosophy and Constructivist philosophy place the child at the center of the learning process (Elkind, 2003). Moreover, these two emphasize exploration, manipulation, and maneuvering materials in the child's own time and pace (Elkind, 2003).

Turning to the online modality, Macdonald (2016) addresses the issues surrounding using computers in a Montessori setting. His bipartisan approach, written pre-COVID-19, offers that machine-based learning may be necessary when there are no other tools or settings available, but reminds his readers of the common practice of limiting screen time—typically television—for school-aged children (Macdonald, 2016).

Jones (2017) discussed reasons technology supports the Montessori philosophy and issues that might impede its effectiveness. Her research addressed the perspectives and attitudes of several teachers toward using computers in a Montessori setting. Her findings indicated that software could support using computers for student-driven research (Jones, 2017), but also posited that faculty need training to move beyond a didactic approach so that technology could have a positive impact on learning, the child, and their development. In an article that connects Maria Montessori with inventors and her theory to the world of scientific curiosity, Powell (2016) posited that Montessori would consider technology a useful instructional tool if it incorporated the senses and did not overwhelm children with information that has not been filtered to match their characteristics in development.

Planning Method

Maintaining Quality: Montessori Instruction Online

During the 2019-2020 school year, the New York City Montessori Charter School (NYCMCS) struggled to balance broad-minded expectations and the traditional measures as established by the authorizing bodies in NYC in response to the COVID-19 crisis in the United States. The initial onset of the shutdown of schools was abrupt and did not allow for much preparation. The NYCMCS team worked strategically and intentionally to take its hands-on, child-centered approach online with minimal preparation. The team included school administration, teachers, the Board of Trustees (especially the Education Committee), and parents.

Montessori education traditionally is student-directed and requires teacher guidance, which entails a great deal of intrinsic motivation on the part of the instructor or guide in the classroom. Using the Montessori principle, *Control of Error*, Montessori teachers create

learning environments, materials and lessons that help students guide themselves to the *right* answer or the information needed to arrive at the necessary outcome (American Montessori Society [AMS], 2019). More specifically, the design of Montessori materials enables the child to get instant feedback about individual work progress, allowing the child to identify, fix, and learn from a mistake without help from an adult. Placing the control of activities in the hands of a child builds the child's self-esteem, self-motivation, and learning (AMA, 2019).

NYCMCS was presented with the very challenging task of determining how to take the Montessori philosophy and practice online. With a shift to the online modality, a conscious effort was made to sustain the Montessori curriculum by focusing on helping children with learning via movement in everyday life and in the sensorial area to help them explore and learn to use the sound, sight, smell, taste, and touch senses. While the school had previously moved to a scripted curriculum for Literacy and Mathematics, this curriculum was still very dependent on concrete representation of concepts that would be hard to do online.

Design of the Online Learning Model.

As an initial response to the school closure, it was clear that the school needed to ensure that every child at least maintained what they had learned so far during the school year. The overwhelming thought at the time of the close was that the school would be closed for two to four weeks. The shift to online learning took place over three phases (see Figure 2).

The Phase 1 response to the shutdown was to transition the students to a pseudo concrete instructional model that would rely heavily on physical materials being sent home with teachers teaching via phone and video conference based on the availability of technology. The primary reason for this approach was to help streamline the transition from in classroom instruction → distance learning → to fully remote instruction. During Phase 1, students received individual phone calls from their teachers, special educators, and service providers. During that instruction, students were taught literacy (i.e., movement education) and Mathematics (i.e., use of senses), and assigned independent work for after the call, thereby maintaining the Montessori approach.

During the first four weeks of distance learning, all students used the materials that were sent home for them over the phone with their teachers while Chromebook laptops and internet hotspots were sent to all students who did not have access. Additionally, the administration trained the teachers on how to utilize Google Classroom and several of the applications that allowed for virtual concrete application of the strategies used in school.

In Phase 2, the challenge was to create the most authentic learning experience possible via this virtual medium. Teachers experimented with various methods of presenting information aiming to create the hands-on, concrete learning experience virtually.

The difference between Phases 1 and 2 was the move from paper-based instruction to the use of computers. The difference between Phases 2 and 3 is that instruction became more interactive via the technology.

In Phase 3, the school adopted two instructional methods with the Montessori principles in place. Teachers created interactive work that the students could similarly manipulate to the physical materials used in class by using Google Jam board in the digital suite and Google Slides. Additionally, students

were encouraged to use household manipulatives and supplies to substitute for the materials used in class, which supported their education using movement. Teachers also created remote versions of their on-site work plans helping to facilitate choice for students, which is a key factor found in the Montessori Classroom, via the use of Google Forms and the Google classroom (see Figure 3).

Many teachers used two separate cameras to teach their lessons. One camera allowed students to consistently see their faces, and another only focused on their hands and the work that they were doing (i.e., working with manipulatives or writing on a whiteboard.) Teachers also utilized digital whiteboards that allowed them to upload images of the manipulatives typically used in the onsite classroom. This allowed teachers to do what the teachers using the live materials were doing while being able to simply manipulate the items using their computer keyboard and mouse.

Self-Sufficient Student Work and Technology Usage. One of the key components of Online Learning at NYCMCS was the idea of the parent not being required to act as the instructor. Teachers made all work and navigation of technology a part of their instruction and regardless of age, students were able to access and utilize all technology without parent intervention.

Enrollment of Non-NYCMCS Students. NYCMCS immediately attempted to lighten the load on parents by offering to enroll the school aged children in their homes if space would permit. This was a saving grace for families who shifted households or stayed with others to care for loved ones or to combine resources.

Assigned Staff Translators. All Spanish-speaking staff members were assigned families who needed translation services. These staff members acted as the translators for families to communicate with the teachers. Parents were able to share concerns with these translators through daily conversations.

Parent and Family Counseling. The school counselor and assistant principal of school culture worked closely with families who identified themselves as needing emotional support navigating the pandemic. This feeling of connectedness translated into a high student-retention rate.

Online Activity-Groups. Additionally, teachers created various activity groups for students to participate in during parts of the day where they would have been in school but now were at home with nothing to do after having completed their class work. These groups allowed for some level of social interaction during this very isolating time.

Instructional Programs

Schedule. NYCMCS conducted an initial parent survey to assess parent preferences with regards to school schedules. About one third of families who completed the survey preferred to have their children participate in remote instruction only. As a result, NYCMCS offered both full time on-site instruction and full-time remote instruction. Half of the students returned to on-site instruction while the other half worked from home. To maintain flexibility and ensure that parents continued to receive choice, instructional units were designed on a trimester basis to facilitate an instructional program where students could transition back and forth between in-person and remote instruction every 12 weeks. NYCMCS also conducted a second

enrollment survey to confirm parent preferences and finalize school schedules.

Moving to at-home online learning was mandated by the State of New York. Initially, all materials were sent to the children at their homes. It was anecdotally reported by teachers that this process was stressful and difficult to do. Moreover, many teachers were concerned for their personal safety. As a result, the NYCMCS then moved to digital learning and supplied all community members with computers to ensure the ease of material creation and distribution.

The NYCMCS sent surveys to parents to gauge the ease of the use of technology (see Figure 4).

Teaching and Learning Requirements. NYCMCS ensured equitable instruction for all students by carefully designing and aligning two educational programs: on-site instruction and remote instruction. Each program consisted of a separate instructional team so that teachers could more easily hone, plan, and design instruction for their specific group of students. Each program sustained continuity of curriculum with assessments to facilitate an appropriate transition between instructional models every 12 weeks. All instruction and curricular materials were standards- and research-based with actual live teacher instruction across the subject areas. All program components and scheduling were communicated to parents prior to the start of the school year, and at the beginning of each trimester.

Teaching and Learning Flexibility. Through the usage of Google Classroom, NYCMCS ensured that all minimum requirements were met or exceeded. This included providing students with all texts, resources in which to draw, write, and record responses for oral exams (functionally found in Google Classroom). The required 180 days of school was met by ensuring that children logged on, attendance was documented, and school was open every day. While the minimal instructional requirement was one hour per day, NYCMCS provided six hours of instruction each day. Moreover, virtual after school services were offered each day. Children had the opportunity to engage with adults until 6 p.m. daily. State guidelines were observed for class size and programming, as well as in all other areas. NYCMCS has the physical capacity to offer full time on-site instruction to all families who prefer this kind of programming. Therefore, flexibility in programming and staffing allowed the school to meet safety and health guidelines, and provided equitable instruction to all students, both on-site and remotely.

Special Education. NYCMCS was committed to providing equitable and effective education to all students. NYCMCS maintained a relationship with the Committee on Special Education (CSE)/Committee on Preschool Special Education (CPSE) and collaborated to ensure that each student was receiving an appropriate education. NYCMCS offered in-person special-education teacher-support systems (SETSS), integrated co-teaching (ICT), and placements in 12:1:1 classrooms for all students with individual education plans (IEPs). NYCMCS also collaborated with the Department of Education to provide all related services, including that of paraprofessionals for students whose IEP required them. Moreover, NYCMCS offered remote intervention and small-group support sessions for students daily.

Timeline. The administration, teachers, and staff planned to aggressively work to make students' acclimation to being in school as smooth as possible. Thus, NYCMCS planned to reopen following the timeline below based on parent feedback, state guidance, and staff input:

1. Whole-school virtual opening began on August 31, 2020.
    a. All students worked remotely.
    b. Teachers taught from their school-based classroom to help acclimate students to expectations for when they would return.
2. Dual programs commenced on September 10, 2020 (was subject to change based on guidance given on August 1).
    a. Remote learning continued for students whose parents had selected this program.
    b. Onsite learning began for some students and increased to capacity in the following way:
        1) September 10 for PreK and all 12:1:1 students
        2) September 11 for PreK- 1 and all 12:1:1 students
        3) September 14 for PreK-3 and all 12:1:1 students
        4) September 15 for PreK-4 and all 12:1:1 students
        5) September 16 for all students

Discussion

As COVID-19 became a tangible issue in NYC, schools were ordered to close their doors, which required that students and staff work from home. Physical closure of the school plant did not remove the need to document student achievement, monitor enrollment, and ensure the equitable availability of technology. These areas became more noticeable because of the differences between onsite versus remote learning.

Student Achievement. NYCMCS is a school in turn-around. Having made great progress year after year since the time of its first charter renewal, student achievement was a key component in the plan to ensure viability of the school and the model. Teachers sent surveys to parents and were required by the school-based team to make reflections and action plans for how to address parent feedback. Internal assessment shows improvement that correlates directly to the state-mandated tests. This measurement is based on pre-made assessments from external sources that are used annually. Results on these assessments have historically mirrored the achievement levels on the state tests. The shut down and move to online learning threatened to limit teachers' ability to effectively teach their students in addition to limiting teachers' abilities to weave in the Montessori concepts and philosophy that guided the way school is operated from day to day in the building.

Research comparing academic achievement before, during, and after this necessary shift to online learning will determine whether online instruction was successful for the students at NYCMCS. Internal results based on school-based curriculum show the following:

1. NYCMCS's history reveals a consistent increase in ELA proficiency of at least 10%, projecting ELA proficiency growth as measured by state exams to have increased to at least 53% in 2020. The most recent BTTM assessment using state exam test questions supports this projection, with a school-wide ELA proficiency score of 51%, with 3rd grade at 58% proficiency.

This number exceeds the state (45%) and district (31%).

2. NYCMCS's history reveals a consistent increase in Math proficiency, projecting Math proficiency growth as measured by Math Exams to have increased to at least 42% in 2020. The most recent Eureka Math data supports this projection, showing a growth of 7 percentage points and therefore projecting 44% school-wide Math proficiency. This number almost meets the state (47%) and exceeds the district (26%).

Teaching a concrete math lesson on-site allowed the children to use manipulatives to hold, see, and touch the quantities on which they were working. Teachers found that this might be limited--if not eliminated--when working online. However, materials in the home settings were substituted. Moreover, literacy is deeply impacted by volume of reading because frequently practicing skills such as drawing meaning from print leads to enhanced comprehension (engageny.gov, 2021). With students working at home all day, teachers indicated that it was more difficult to ensure that students were spending long periods of time with their eyes on the text (D. Cummings-Clay, personal communication, June 17, 2020).

Enrollment. NYCMCS is known among its families for its aesthetically beautiful materials, spacious classrooms, and building. Not being in the physical building took away some of the appeal of the school and thus put the school in direct competition with schools who may be more technology heavy in their programming. Families could select to transition their students to a school that supplied more advanced technology or was underwritten by a tech mogul.

NYCMCS is sought out by families who want Montessori education for their children. The components that families often speak of most when enrolling their children in the school are the manipulatives and materials, groupings of students, and one-on-one instruction (Abeku Hayes, personal communications, 2018-2020). An additional concern was for retaining parents who had their children bussed to NYCMCS, who could likely elect to enroll their children in neighborhood schools in their immediate area because of ease of access.

Equitable Technology Access: Determining and Responding to Need. NYCMCS was given two business days to create a plan for working with its students, disseminate materials, and ensure that students had the technology they needed. This was a difficult issue that posed a concern because of the lack of turn-around time to get students working online without missing days of school. NYCMCS needed a plan for addressing these concerns.

NYCMCS had teachers contact families, individually, to speak with them about the availability of internet and technology in their homes. It was concluded that all families did not have the same quality of internet, technology, or savvy (Abeku Hayes, personal communication, June 1, 2020).

The leadership team at NYCMCS worked closely with teachers and parents to determine the assets the school community had in the realm of materials, technology, and manpower. Surveys were sent to families and teachers in their home language to identify the strengths the school could draw on to provide effective online instruction. This information was shared via Google Forms with leadership to help determine the type of technology and where the appropriate technology needed to be shipped. NYCMCS then worked with a third-party service to ship Chromebooks and Internet

hotspots to the families who required them. Students received these materials and then were walked through logging on via phone calls with Operations staff.

Transition from physical materials to virtual materials. At the end of week four of the shut down, students were transitioned from the materials teachers sent home to 100% digitally created and completed materials. Teachers began to rely completely on the online Google Classroom tools to meet student instructional needs (see Figures 1 and 2). This is a critical element in the Montessori curriculum to help children grow in sensorial areas of sound, smell, sight, taste, and touch to advance the likelihood of children to continually explore (Calvin-Campbell, 1998).

Inter-institutional Support

Hostos Community College (HCC), a two-year college within the 25 campuses of the City University of New York (CUNY), located in Bronx, New York, provided support to NYCMCS during the pandemic. Two HCC faculty members currently serve on the NYCMCS Board of Trustees. One served as deputy chair of the board and, at HCC, serves as co-chair of the college's Educational Technology Leadership Council. The other is past chair of the board and serves as chair of NYCMCS's Education Committee. Both are experienced in designing online courses for the Early-Childhood Teacher Education program at HCC. These individuals, through service on the NYCMCS's Education Committee and the full Board, shared their expertise regarding online education and their experiences in faculty development through the HCC Center for Teaching and Learning.

During monthly NYCMCS board and committee meetings, these HCC faculty members, school administration, and other board members discussed best practices for creating positive online learning environments while maintaining the effectiveness of the physical classroom when open. These strategies included developing teacher-student engagement techniques and providing professional development for teachers. The dialogue itself helped the NYCMCS principal and administrative staff to reflect on the processes and strategies in usage recognizing the support and resources of both the NYCMCS Board of Trustees and HCC (Denise Cummings-Clay, personal communications, April-September 2020).

The collaboration between HCC and NYCMCS mirrors that of HCC with several community high schools. Developed under the HCC Center for Teaching and Learning, the practice of sharing perspectives and strategies among faculty and administrators--and in this case board members--is based on the common goal of providing effective instruction within a community. The goals of such collaborations were posited at a national convening to discuss how to move toward curricula that is centered on skills-based success and include: "a) direct PreK-12 involvement with higher education; b) direct higher education involvement with PreK-12 curriculum; c) ongoing conversations" (J. M. DiSanto, personal communication, September 23-23, 2014; Nunez Rodriguez et al., 2017, pp. 408).

Maintaining Enrollment: The Challenge of Connecting in a Pandemic

School culture and climate are integral parts of any school as well as the presence of the Montessori values of grace and courtesy, which are needed to make the transition to the online classrooms. Additionally, it became imperative to work with parents using the most effective

tool available during the pandemic--online meetings (Olmstead, 2013). Maintaining parents' ability to ask questions, share ideas and concerns, participate in shared decision-making, and support an atmosphere of respect was an important part of this shift to online instruction.

Although the online modality was different, students were expected still to complete lessons that targeted specific learning standards or grade expectations. Online exercises could require reading, watching a video, and/or taking exams (Currie-Rubin & Smith, 2014).

The need existed for parents and/or other family members to be available to answer questions and ensure that children were engaged in the lessons and that they completed them. An essential element to ensure a child's success in school is family involvement (Henderson & Mapp, 2002). Families want to feel appreciated for the involvement they provide and desire to feel connected to their child's learning outcomes as well as to the teachers furnishing instruction (Currie-Rubin & Smith, 2014). E-mail is a tool that can enable effective parent-teacher connections (Currie-Rubin & Smith, 2014). Parents and teachers can exchange questions and answers regarding child progress and keep current regarding family news in addition to sharing ideas to aid students who are struggling or provide links to digital resources (Currie-Rubin & Smith, 2014). Phone calls are another method to further enable parent-teacher connections (Currie-Rubin & Smith, 2014). Moreover, the usage of digital tools that connect students and teachers along with those that connect peers are optimum (Currie-Rubin & Smith, 2014). Furthermore, live video conferences are useful to connect parents and teachers for meetings or discussions regarding annual student goals, student progress, benchmarks, online learning focus, and/or planning proactively, etc. (Currie-Rubin & Smith, 2014).

Communication. The NYCMCS prioritized communication with its families and students through surveys, emails, phone calls, and school messaging software. The teachers at NYCMCS worked as the intermediaries between the school and families because they remotely accessed the families' homes daily. Parents were encouraged to reach out to the teachers with any concerns or questions, which were then relayed to school leadership.

Currently, the main mode of communication at the school is email and phone calls. Parents who do not respond to the translated emails that are sent weekly are given follow up phone calls. During instruction, teachers make three attempts to connect with the students and families for each lesson being taught.

Mailers, information packets, and automated messages continue to be utilized as the school's primary methods of communication to get school started. The methods will be shifted as needed to ensure that the school is remaining responsive to the needs of its families.

Daily Phone Calls. All teachers were required to make three attempts, daily, to reach each child. If students were unable to be reached, leaders would work to find the families through other means. This led to a strong sense of school presence and responsiveness for families (Currie-Rubin & Smith, 2014). Teachers were able to interact with parents to update them regarding their child's progress and solicit home support or intervention where applicable (Currie-Rubin & Smith, 2014).

Results

The school's institutional identity enlarged with the shift to the online modality. First, the cultural aspects of how the school approached instruction were difficult to sustain. Second, the method of instruction shifted from child-centered to teacher-centered. Third, creative lesson planning helped sustain the Montessori curriculum of focus on both the practical and sensorial areas. Lastly, building community was the glue among stakeholders in helping the children advance in their learning outcomes.

To help address the cultural aspects of how NYCMCS approached instruction, teachers relied heavily on animations, interactive worksheets and the myriad of newly developed materials created in response to the pandemic. What became a struggle was creating inquiry-based environments that allowed students to discover content in the ways they would in the classroom. In the younger grades, many of the materials were demonstrated on camera and videos. Additionally, teachers created digital versions of many of the Montessori lessons attempting to produce work for the children to work with akin to how they would navigate work in school.

The second impact was the unavoidable manifestation of teacher-centered teaching. Since the Montessori philosophy embraces three different epistemologies including Nativism, Empiricism, and Constructivism (Elkind, 2003), the Montessori approach remained in place although the teaching method shifted. Nativism seemed to be stronger as children developed their own ways of approaching the new online classroom. Empiricism continued with the children learning through their senses at home and in the online classroom with exposure to differences than before with respect to feeling, looking, listening, tasting, and touching. Finally, Constructivism continued with the children understanding and interpreting what they were learning through their own activities.

Thirdly, NYCMCS held onto its Montessori philosophy and practice since it was able to continue offering the concrete to abstract path of content acquisition for students. Teachers worked with premade curriculum that philosophically lined up with the Montessori method and as a result, the school was able to maintain its core beliefs in students needing concrete to abstract application of knowledge to learn in a deeper, more valuable way.

Lastly, it was discovered that the intentional building of community among students, and building of community between students, teachers, and families in the online modality was imperative to sustaining the Montessori philosophy and facilitating child learning outcomes. Taylor (2017) points out that the process of building community in the learning setting needs to walk beside the academic process. Watson (2007) suggests that teachers or online program staff offer technological and/or academic aid to students through communications such as the phone, email, live chat, or a combination of these. In many instances, a mentor or coach—frequently a parent—is identified to help the student in the learning process (Watson, 2007).

Children will excel in their academic pursuits when sufficient time is provided for creating a learning community that feels safe, dependable, and calm with a child-centered structure of fairness, honesty, and choices balanced with assignments (Taylor, 2017). To build community among children, they need to know that the teacher believes in them, that each of them is a good person, and that the teacher cares about them in all situations (Taylor, 2017). Thus, online programs require teachers to log in to their classes for specified time periods and

offer guidance regarding how swiftly they must reply to student inquiries (Watson, 2007). As an advantage, teacher presence can help students experience increased comfort in participating in a discussion board assignment online or in their behavior if the class is recorded (Watson, 2007).

To build a relationship and community, the teacher must talk to and interact with each child (Taylor, 2017). In addition to planning learning opportunities and communicating with children, the teacher must guide student learning in the online context (Watson, 2007). This can be accomplished by forming and facilitating group discussions, creating class projects, and/or tweaking course materials in reply to the questions of children and the concepts that they fail to understand (Watson, 2007). Most importantly, children need to be oriented to their setting in addition to embracing the routines of the day in the educational context like recording educational progress, using the restroom, how paper is used, and how to care for the setting for which they find themselves, etc. (Taylor, 2017).

The COVID-19 pandemic unmasked that everyone was in crisis. Children who are in crisis usually fail to think that what they contribute to their community is valued or respected (Taylor, 2017). Thus, children in crisis rely on teachers to stick with them through their exhibiting volatile behaviors, or throughout adverse incidents or crisis situations (Taylor, 2017). Thus, teaching online can be more time consuming than in the classroom due to the amount of individual attention that each student receives online as many teachers have reported (Watson, 2007). This was the case for NYCMCS teachers teaching online. They were committed to teaching and supporting the needs of each child in the online context. They affirmed what Taylor (2017) indicated that it is the teacher's task to support children, believe in their ability or potential, and steer them as they learn about qualities like kindness, empathy, self-advocacy, and making contributions as a community member as well as to urge them to engage in opportunities for service, which is a building-block for adult citizenry.

Conclusion

The COVID-19 pandemic expanded NYCMCS's teaching and learning landscape. The school embraced the usage of technology and shifted to virtual spaces remotely to help children learn. Over time, children adapted to learning in the online modality. They not only learned the content housed in the multiple disciplines for which they had been engaged in the traditional classroom, they gained skills in technology usage. They were exposed to other modes of reviewing academic content and chances to help them make connections to the content. Teacher-created collaborative opportunities for student peers in this modality fostered communication and social interaction among students resulting in the advancement of their learning outcomes.

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