Education Plan

A.1 Educational Philosophy

Overview

P.V. Montessori School will offer exceptional and academically rigorous Montessori programs to all K-3 grade level children in West Phoenix area (Goodyear, Litchfield, Avondale), most of which represent the remote rural areas of the Greater Phoenix. P.V. Montessori School will be the first Montessori school program offered in that rural remote community.

The Montessori Method selected fits very well with the diverse K-3 target population of the West Phoenix rural area of Goodyear. P.V. Montessori School will be the first public Montessori school program offered in that rural community and will increase the choices of parents for high quality academic programs there.

The Montessori program at P.V. Montessori School is designed to address the diverse needs of the target population – the Montessori Method addresses all intelligences and styles of learning—musical, bodily-kinesthetic, spatial, interpersonal, intrapersonal, intuitive, natural, and the traditional linguistic and logical-mathematical—are nurtured and respected. The practical application of the Montessori Method is based on human tendencies— to explore, move, share with a group, to be independent and make decisions, create order, develop self-control, abstract ideas from experience, use the creative imagination, work hard, repeat, concentrate, and perfect one's efforts.

P.V. Montessori School will offer its programs in the following configuration, consistent with the Montessori philosophy and method, where students are placed individually according to ability and readiness rather than chronological age.

Primary and Kindergarten *3-6 years old*
The **Primary Program** at P.V. Montessori School is a 3-4 year cycle for students 3 to 6 old. The **Kindergarten Program** which is part of the Primary Program in the Montessori setting includes half day of tuition free charter education.

Lower **Elementary** *6 - 9 years old*
P.V. Montessori School will offer charter, tuition free, multi-aged classrooms with a three-year elementary cycle. The Lower Elementary program is equivalent to 1st through 3rd grades;

Educational Philosophy

The educational program of P.V. Montessori School possesses the necessary rigor and relevance to support K-3 grade students in their outcome-based Montessori education for strong academic growth. The program at P.V. Montessori School is designed to provide an excellent KG through third grade school, which prepares students for the rigors of the next step of excelling middle and high schools and further success in college, career and life.

Montessori is naturally an advanced and rigorous educational program because of the inherent characteristics of the scope of the curriculum – it allows for advanced work at a younger age. The hands-on multisensory instructional methodology allows the introduction of difficult and

academically challenging information at a younger age. P.V. Montessori School will also share the educational approach of the most successful Montessori charter schools in Arizona and nationally, such as Khalsa Montessori, Mission Montessori, Villa Montessori, which are among the top schools in Arizona, whose students have achieved some of the highest academic achievements and student-level academic growth based on state assessments and national Montessori certifications. The Montessori students at P.V. Montessori School will benefit in the future from their better quality of rigor, academic and personal experience at the school. When they enter high school or college, more of them will have learned how to enjoy working hard, thus connecting intellectual rigor with "real world" experiences.

Montessori educators have long prepared students for their future in the "real world" (Seldin, 1996; Weaver, 1996) [1]. Montessori outcomes as identified by Nancy Rambusch, founder of the American Montessori Society (AMS) (Rambusch & Stoops[2], 1992) are one of the components of Montessori schools that first attracted parents to this method of education. Montessori schools strive to produce students: who are moral beings; who are confident, competent learners; who are independent; who are autonomous; who are intrinsically motivated; who are academically prepared; who are socially responsible; who are free within limits; who are spiritually aware; who are able to handle external authority; who become citizens of the world; and, who become stewards of the planet. (Rambusch & Stoops, 1992, pp. 43-44).

Those outcomes, sought by the Montessori program, indicate that the Montessori Method with its inherent foundational principles naturally helps students to prepare their 21st Century skills so essential for future work and success in high school and in later on in college, and defined by the 21st Century Workforce Commission National Alliance of Business as one *"that includes strong academic skills, thinking, reasoning, teamwork skills, and proficiency in using technology."* [3] For instance, we all know that Google Founders Larry Page and Sergey Brin credit Montessori for their achievements. Now Jeremy Allaire, CEO of Brightcove, an online video platform for Web sites has stated that "One of the most important influences early on was being educated in a Montessori setting. The Montessori ethos was very formative for me because it build into me a belief in self-direction, in independent though, in peer collaboration, in responsibility."

Many of the learner outcomes of a Montessori program require assessment of higher order thinking skills like the demonstration of problem solving, analysis, and implementation. Montessori students are assessed using a variety of alternative assessment practices that involve student projects, student portfolios and verbal discussion skills in addition to the more traditional demonstration of student performance through criterion and norm-based assessments[4].

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[1] Seldin, Tim. *Montessori Research Findings* from http://montessori.org

[2] Rambusch, Nancy M.; Stoops, John A. (May 2002). "The Authentic American Montessori School. A Guide to the Self-Study, Evaluation, and Accreditation of American Schools Committed to Montessori Education."

[3] http://enGauge.ncrel.org and www.metiri.com. *enGauge—Twenty-First Century Skills.* Developed by the Metiri Group in partnership with The North Central Regional Educational Laboratory ©NCREL.

[4] Roemer, Kathy Lynn. *Assessment Practices Used By Montessori Teachers Of Kindergarten Through Sixth Grade Students In The United States.* A Dissertation Presented for the Doctor of Education Degree. The University of Memphis, May 1999

Eight Research-Based Foundational Principles of Montessori Education support the rationale for the selected program for the target population at P.V. Montessori School[5]:

Angeline Lillard [6], one of the authors that have dedicated years of research of the Montessori Method defines and describes in depth the eight foundational principles of Montessori Education that explain the rigor, relevance and relationships that have made the Montessori Method so successful and renowned in educating diverse groups of learners. In her book, Lillard (2005) also describes and discusses the research, which supports those eight foundational principles of Montessori Education. The eight principles as defined and discussed by Lillard (2005) are as follows:

(1) Movement and cognition are closely entwined, and movement can enhance thinking and learning: There is an abundant body of modern research that supports this theory, demonstrating that from infancy to adulthood, movement helps improve understanding of the correlation between space and objects, judgment, memory and social cognitive processing. One such study involving school-age children was conducted by Levin, Siegler and Druyan in 1990[7]. The study provided two forms of training to correct a misconception. After the visual training, 46% of the children in group A correctly surmised that the outside object must be moving faster. After the training involving movement, 79% of the children in group B understood the same (Lillard, p.53).

(2) Learning and well-being are improved when people have a sense of control over their lives - free choice. Dr. Montessori asserted that because life is based on choice, children must learn to make their own decisions. Dr. Montessori also recognized, and current research confirms, that too much choice leads to chaos. For this reason, the Montessori Method is presented in an environment deliberately set up to give children the perception that they are in control of their own choices while allowing the teachers to guide them to appropriate work (Lillard, p. 93).

(3) People learn better when they are interested in what they are learning: There is also ample research supporting this idea. In one study, students were asked to indicate what subjects interested them and which did not. They then read short passages in areas of high and low interest. Comprehension scores for the passages of high interest averaged 86%, while those for passages of low interest averaged 67%. (Lillard, p.118).

(4) Tying extrinsic rewards to an activity, like money for reading or high grades for tests, negatively impacts motivation to engage in that activity when the reward is withdrawn: Dr. Montessori found through observation that a child who is permitted to educate himself is contented to simply achieve the task at hand. Current research also shows that if a person is already motivated to do something, expected rewards actually interfere with their subsequent interest in the activity. Young children are intrinsically motivated to learn and suffer reduced motivation if rewards are presented (Lillard, p. 154). Mark Lepper, a professor of psychology at Stanford University, who has extensively studied intrinsic and extrinsic motivation conducted a

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[5] http://www.michaelolaf.net/1CW312MI.html#Multi - *Child of the World, Montessori from Three to Twelve Years.* "Shared with permission of The Joyful Child Montessori Company: www.thejoyfulchild.us"

[6] Lillard, Angeline. *Montessori: The Science behind the Genius.* Oxford University Press, 2005 at http://www.montessori-science.org/montessori_science_genius.htm#desc

[7] Levin I, Siegler RS, Druyan S (1990) Misconceptions about motion: Development and training effects. *Child Development 61: 1544- 1557*

study in the 1970s in a classroom for 3 to 5 year olds. First, the two groups that had no "expectation of reward" were rated significantly higher by judges for their drawings than the group that had expected a reward. Second, after a few weeks, when the frequency with which the markers were used was observed, those who had at one time expected a reward drew with the markers less than they had previously and only half as much as the other two groups. Children with no expectation of rewards were motivated to draw for the joy of doing it (Lillard, p. 155).

(5) Collaborative arrangements can be very conducive to learning: Montessori education is more in line with what developmentalists know about children: they pursue knowledge in self-formed groups, creating products ranging from reports to dioramas, charts to plays, and timelines to musical scores. Recent research supports higher achievements when learning together and from peers, rather than working as individual units striving for the highest grades. Dr. Montessori observed that children learn by studying the actions of others. Through imitation, peer tutoring, and collaborating, they learn new concepts most efficiently. In one intriguing study (Ryalls, Gul, &Ryalls, 2000[8]), two groups of toddlers observed either a female adult completing a sequence of tasks, or a three-year old boy completing the same tasks. Immediately after observation, the toddlers were given the same tasks to complete, and then again one week later to see how much they would imitate. Regardless of the delay in time, toddlers who had observed the three-year old boy were able to complete more complex action sequences than did children exposed to an adult model, suggesting that the peer elicited more imitation (Lillard p. 200). "There is nothing that makes you learn more" held Dr. Montessori, "than teaching it yourself". The research in peer tutoring indicates that specific conditions must be present in order for children to benefit. The tutoring must be specific and structured, and the tutee must only be slightly younger or less advanced than the tutoring child. In one study (Greenwood et al.,1987[9]), children who had learned spelling words in a highly structured peer program reproduced the words correctly 87% of the time compared to children who had learned the spelling words from a teacher and a work book and reproduced the words accurately 75% of the time (Lillard, p.204). The tutor also benefits via having to justify and explain a certain position, thereby solidifying his or her knowledge on the subject (Lillard, p. 209).

(6) Learning situated in meaningful contexts is often deeper and richer than learning in abstract contexts: In traditional schooling, children sometimes learn without understanding how their learning applies to anything besides school tests. Dr. Montessori reacted to this by creating a set of materials and a system of learning in which the application and meaning of what one was learning should come across to every child. Rather than learning largely from what teachers and texts say to them, children in Montessori programs learn largely by doing. Because they are doing things, rather than merely hearing and writing, their learning is situated in the context of actions and objects. For example, as described earlier, children go out of the Elementary classroom and into the world to research their interests. A small group of children who have become interested in bridges, for example, may choose to locate a local engineer who will meet with them to explain how bridges are designed. This approach, sometimes referred to as "situated cognition," reflects a movement in education that goes alongside current interests in cultural psychology, apprenticeship, and how people learn through participating in their culture. Dr. Montessori stated that, .to

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[8] Ryalls, B. O., Gul, R. E., & Ryalls, K. R. (2000). Infant imitation of peer and adult models: Evidence for a peer model advantage. *Merrill-Palmer Quarterly, 46, 188-202.*

[9] Greenwood, C. R., Dinwiddie, G., Bailey, V., Carta, J. J., Dorsey, D., Kohler, E, Nelson, C., Rotholz, D., & Schulte, D. (1987). Field replication of classwide peer tutoring. Journal of Applied Behavior Analysis, 17, 521-538.

establish the relationship between things is to bring knowledge. Meaningful contexts connect new knowledge to old knowledge, make clear the relevance of new knowledge and make it more interesting and enjoyable. Meaningful contexts assist in assimilation, processing and the motivation to learn new concepts (Lillard, p. 234). Modern research supports this idea fully. Mark Lepper and his students conducted a study in which they taught 10-year olds some of the basics of a graphics program language called, "LOGO". The results showed that not only had the children who learned the concept with meaningful context learned the program better, but they reported having liked it more than the children in the control group. Further, the experimental group performed better on a geometry test with underlying skills from the program such as the estimation of angles and distances (Lillard, p.228).

(7) Particular forms of adult interaction are associated with more optimal child outcomes: Dr. Montessori's recommendations on how teachers should interact with children anticipated later research on parenting and teaching. When adults provide clear limits but set children free within those boundaries, and positively respond to children's needs while maintaining high expectations, children show high levels of maturity, achievement, empathy, and other desirable characteristics. A Montessori teacher maintains an inspiring learning environment, times new lessons appropriately, and intervenes when the children need guidance or structure, but sits back and actively observes when they do not. Montessori teachers who observe disruptive behavior do not punish, scold or lay blame on a child, but rather redirect the child's activity to something more purposeful. Teachers are to show warmth and sensitivity and to have high standards of behavior in the classroom. Research suggests that the authoritative (high in warmth and control) adult-child interactions are effective. In one study, sixth graders were asked about their perceptions of their teachers. These perceptions were examined with respect to academic performance, pro-social behavior, social responsibility, a sense of mastery and how much control was exerted over them versus how much control they had over themselves. A variety of different students from different backgrounds were included in the study. The extent to which teachers were seen by the children as having high expectations (a characteristic of the authoritative style) was linked to children's tendency to be more apt to pursue pro-social goals such as sharing, to be socially responsible, to be interested in class, and to have a strong mastery orientation: they wanted to learn (Lillard, p. 279).

(8) Order in the environment is beneficial to children: Montessori classrooms are very organized, both physically (in terms of layout) and conceptually (in terms of how the use of materials progresses). Research in psychology suggests that order is very helpful to learning and development, and that Dr. Montessori was right on target in creating very ordered environments in schools. Children do not fare as well in less ordered environments. Research on order has positive neurological impact of presenting orderly sequences of materials intended to tune the senses of children. Order is a quintessential element in the Montessori classroom. Organization in the Montessori classroom is most notably observed in three areas: Schedules and routines (temporal order), classroom set-up (spatial order) and noise control. In one study, increased regularity and predictability in home routines for four year olds indicated better academic results when the children reached 8 years of age, most particularly, higher math achievement (Fiese & Kline[10] 1993). Montessori classrooms are also very quiet. Research shows that noisy environments lead children to block out stimuli, which can hinder their learning in such environs. Links between excessive

[10] Fiese, B. H., &Kline, C. A. (1993). Development of the Family Rituals Questionnaire: Initial reliability and validation studies. Journal of Family Psychology, 6, 290-299.

noise and reduced auditory discrimination skills, reading skills, and language skills have been found in several studies. For example, one study conducted by Cohen, Glass and Singer[11] in 1973 showed how auditory discrimination (being able to tell the difference between words like "near" and "gear") in children living in a high rise apartment building near the expressway improved the higher up (and further away from the noise) the children lived in the building (Lillard, p. 314).

Rationale and Research in Support of the Montessori Method of Education for the Target Population

P.V. Montessori School plans to open in 2013 and and targets to service students in grades K-3. P.V. Montessori is committed to implementing a true Montessori education program for students and families in the Goodyear, Litchfield, Avondale area for the following reasons:

1. P.V. Montessori School will offer a true Montessori program to all K-3 grade level children in West Phoenix area (Goodyear, Litchfield, Avondale), most of which represent the remote rural areas of the Greater Phoenix.

2. P.V. Montessori School will be the first public Montessori school program offered in that rural remote community, making the Montessori program, which has historically been a private high tuition option, a viable public choice for parents, opened to all children.

3. Palm Valley Montessori is a preschool that has been serving families and children in this community since 2002, and they are actively supporting our efforts to open P.V. Montessori School. On many occasions over the past two years, the founders have met with families both from Palm Valley Montessori and from the community at large who support the school's mission to expand the Montessori continuum in the area.

4. The Montessori program at P.V. Montessori School is designed to address the diverse needs of the target population – the Montessori Method addresses all intelligences and styles of learning—musical, bodily-kinesthetic, spatial, interpersonal, intrapersonal, intuitive, natural, and the traditional linguistic and logical-mathematical—are nurtured and respected. The practical application of the Montessori Method is based on human tendencies— to explore, move, share with a group, to be independent and make decisions, create order, develop self-control, abstract ideas from experience, use the creative imagination, work hard, repeat, concentrate, and perfect one's efforts.

[11] Cohen, S., Glass, D. C., & Singer, J. E. (1975). The effects of noise and crowding on the development of verbal skills. In V. Kouskoulas & R. B. Lytle, Jr. (Eds.), The proceedings of the international conference on urban housing and transportation (pp. 248-253). Detroit, MI: Wayne State University Press.

Research strongly supports the Montessori Method for outstanding academic achievement[12],[13]:

Student Achievement

- A comprehensive study by Drs. Angeline Lillard of the University of Virginia and Nicole Else-Quest of The University of Wisconsin-Madison, focusing on poor and lower-middle class students from Milwaukee advanced the following quantitative assertions about the effectiveness of Montessori education:
    - Montessori classrooms produced results that were found to be academically and socially superior to traditional programs.
    - Montessori students were also better at "controlling their attention during novel tasks, solving social problems and playing cooperatively" (Bower, 2006 p. 212)
    - Upon the completion of kindergarten, Montessori students scored higher than their peers in public and private schools on standardized math and reading tests.
    - Upon completion of elementary school the Montessori students were able to write essays with more imagination and depth than their peers in public and private school (cited in Bower, 2006, p. 212).
- Researchers also indicated that Montessori students performed well on standardized tests and demonstrated higher levels of learning than their peers when tested later in life (Schapiro, 1993). Recent empirical data suggested that some young Montessori children were able to master reading and writing before age 6 (Edwards 2002). Furthermore, a comprehensive evaluation of middle school programs in the U.S. showed that, "Montessori students reported greater affect, potency, intrinsic motivation, flow experience and undivided interest while engaged in activities during school" (Rathunde & Csikszentmihalya, 2005, p. 363).
- Students enrolled in Montessori middle schools reported a significantly better quality of experience in academic work. Compared to their non-Montessori peers, the Montessori students felt more active, strong, excited, happy, relaxed, sociable, and proud. They enjoyed their studies more, had greater interest in their work, and they wanted academic work more than the traditional students. (Rathunde, 2003)

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[12] Outcomes for Students in a Montessori Program a Longitudinal Study of the Experience in the Milwaukee Public Schools", NCERI, The National Center on Educational Restructuring and Inclusion, the Graduate School and University Center, the City University of New York.

[13] Cited Montessori research findings at: http://www.montessori.org/imc/. Complete Reference:

Boehnlein, Mary Maher. (1990). *Research and evaluation summary of Montessori programs. In Implementing Montessori education in the public sector.* Cleveland, Ohio: NAMTA.

Boehnlein, Mary Maher. (1988). Montessori research: Analysis in retrospect. *The NAMTA Journal, 13*(3), 1-119.

Chattin-McNichols, John. (1992). What does research say about Montessori? In Margaret Howard Loefller (Ed.), *Montessori in contemporary American culture* (pp. 69-100). Portsmouth, N.H.: Heinemann Educational Books.

Dawson, Marcella. (1988). *A comparative analysis of the standardized test of scores of students enrolled in the HISD Montessori magnet and traditional elementary classrooms.* Texas Southern University: Unpublished Master's Thesis.

Duax, Tim. (1989). Preliminary report on the educational effectiveness of a Montessori school in the public sector. *The NAMTA Journal, 14*(2), 56-62.

Karnes, M., Shwedel, A., & Williams, M. (1983). A comparison of five approaches for educating young children from low-income homes. In *As the twig is bent: Lasting effects of preschool programs.* Hillsdale, N.J.: Lawrence Erlbaum Associates.

Miller, L., & Medley, S. (1984). *Preschool intervention: Fifteen years of research.* Paper presented at the American Psychological Association Annual Meeting, Toronto, Ontario.

Public School Montessorian. (1990). Research. *Public School Montessorian, 2*(2).

Rathunde, K. (2003). *The NAMTA Journal, 28*(3), 12-52.

Takacs, C., & Clifford, A. (1988). Performance of Montessori graduates in public school classrooms. *The NAMTA Journal, 14*(1), 1-9.

- A majority of students scored above fiftieth percentile on Iowa Test of Basic Skills at the MacDowell Elementary School, a Montessori magnet school program in the Milwaukee school district. (Duax, 1989)
- A study in the Milwaukee public schools (Dohrman, 2003) showed that children who were in the public Milwaukee Montessori schools from preschool to fifth grade scored significantly higher on standardized tests (ACT and WKCE) in math and science than did matched controls from their same high schools.
- Minority students enrolled in a Montessori program scored higher on self-concept, mathematical and geometric concepts, vocabulary recognition, attention strategies, and general intelligence. (Boehnlein, 1988)
- Black and Hispanic Montessori students scored significantly higher than other minority students on both the Iowa Test of Basic Skills and the Metropolitan Achievement Test 6 in Houston, Texas. (Dawson, 1988)
- 75% of low SES children who attended a Montessori preschool in Cleveland, Ohio, scored above school norms on the California Achievement Test. (Takacs & Clifford, 1988)
- Montessori students scored 10 - 20 points higher on the California Achievement Test compared with students in traditional classrooms. (Pubic Montessorian, 1990)

Social Development is Enhanced

- Montessori children in their kindergarten year demonstrated greater social development in the areas of sense of reasoning, justice, and fairness. They were more likely to engage in emotionally positive play with peers, and less likely to engage in rough, aggressive forms of play. By the end of their elementary program, Montessori children offered more positive solutions to social challenges. (Lillard and Else-Quest, 2006)
- Higher levels of self-confidence and greater participation in social interaction and for longer periods were found in Montessori students (Boehnlein, 1990).
- A great deal of research has validated the importance of teachers and peers for student education and achievement. Perceiving teachers as supportive is crucial for students' motivation and achievement (Goodenow; Fraser & Fisher; Harter; Wentzel). Successful peer interaction at school has been associated with student engagement, useful cognitive strategies, problem solving, adjustment to school, academic achievement, and self-regulation (Berndt & Keefe; Brown; Dimant & Bearison; McCaslin & Good; Ryan & Patrick). Given that teachers and students create the social context in which students spend dozens of hours each week, there is little doubt that the quality of these relationships in the Montessori schools will be a significant advantage for the future success of the students.

Longitudinal Findings

- Montessori students were rated by their middle grades teachers in Milwaukee as "above average" on follows directions, completes work on time, listens attentively, uses correct grammar and spelling, class enthusiasm, multicultural awareness, and responsibility and dependability. (Duax, 1989)
- High school students who attended a Montessori Head Start program achieved highest level of mathematics and reading compared with students who attended other types of Head Start programs. (Miller & Medley, 1984)
- Highest high school graduation rate, lowest grade level retention rate, and highest school success ratings were achieved by students who attended Montessori early childhood programs. ((Karnes, Shwedel, & Williams, 1983)
- Increases in attention strategies, general intelligence, and academic achievement occurred over time by Montessori students from all socioeconomic levels. (Chattin-McNichols, 1992)

Brain Research

- Recent brain research supports that concept. Montessori teachers are trained deeply in the most recent brain research: Brain research has concluded that (1) no single area of the brain can function alone, (2) individuals generate and associate different meanings to similar experiences, (3) the brain grows in spurts, (4) the brain responds to the environment surrounding it, (5) the brain can easily establish elaborate abstract coding and decoding systems, and (6) the brain deals with the world systematically. The role of the Montessori teacher -making the children the center of learning, encouraging children to use the freedom provided for them, observing children in order to prepare the best possible environment, recognizing sensitive periods, and diverting unacceptable behavior into meaningful tasks - supports the implications of this research.

The Arizona Growth Model

The Arizona Growth Model developed by the Arizona Charter Schools Association[14] shines a spotlight on Arizona's most effective schools – district and charter – that produce the highest sustained academic rates of growth in students. A statistical analysis of the AIMS reading and math data of over 700,000 students in all public schools in Arizona and a four-step filtering process were used to identify the very best charter schools in the state. "Success Measured" placed Khalsa Montessori as one of the top three schools in the state. Additionally, the study points to 4 other Montessori charter school in the top 29 of 259 charters with high student-level growth and success.

[14] Arizona Charter Schools Association http://www.azcharters.org/