REENVISIONING OUTDOOR EDUCATIONAL SPACES FOR PRIMARY SCHOOL CLASSROOMS AND DESIGNING FOR ALL MODALITIES OF INTELLIGENCE

Lara Remitz

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Title: Reenvisioning Outdoor Educational Spaces for Primary School Classrooms and Designing for All Modalities of Intelligence

By: Lara Remitz

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Approved:

Sheryl Ann Simpson, Independent Project Chair

Michael Rios, Independent Project Advisor

Passion is lifted from the earth itself by the muddy hands of the young; it travels along grass-stained sleeves to the heart. If we are going to save environmentalism and the environment, we must also save an endangered indicator species: the child in nature. (Louv, 2008)

REENVISIONING OUTDOOR EDUCATIONAL SPACES FOR PRIMARY SCHOOL CLASSROOMS AND DESIGNING FOR ALL MODALITIES OF INTELLIGENCE

ABSTRACT

Outdoor education is not a new pedagogical method. It is constantly revised and updated along with the changing scholastic environment. The need for reinforcing abstract learning with concrete experiences has been pointed out by educator-philosophers throughout time. And as technological advances can bring students indoors and focused on a screen, the need for outdoor education has increased. Aspects in designing for outdoor education have included curriculum, location, environmental systems, and student interactions. It is within our interests to find the link between how students learn and their modalities of intelligence and using that information to design outdoor education spaces for all learners.

Keywords: Outdoor Education; Pedagogical; Curriculum; Modalities of Intelligence

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INTRODUCTION

Outdoor education for the purposes of this study is the practice and design of spaces that are within the landscape on and surrounding a school that encourage and foster children's growth physically, socially and mentally. However, prevalence of outdoor education in primary schools during regular instruction is few and far between. In fact, the California Department of Code and Regulations has no mandate for outdoor educational areas other than asphalt and turf for physical education. (California Department of Education, 2016) Many campuses have large expanses of asphalt that leaves little to no room for educational experiences.

And yet so much has changed in the past 15 years within the indoor classroom with the implementation of No Child Left Behind Act and Every Child Succeeds Act. It would appear that the education system is under reform to improve children's education and to create a better future for society. I spoke with a professor who had been a teacher for primary education for 30 years and she said, "It is the pendulum effect." (Landsaedel, 2016) This was referring to the freedom teachers had before with the curriculum and now it is so structured around testing that the objective gets lost and teaching critical thinkers gets pushed under the rug.

The education system has so many moving parts and factors that sometimes society forgets what education is for. Education is for the student. The student is the center of this complicated system. To improve the educational system we must look at the student and how a student learns and adsorbs information to be able to design a successful environment for learning both indoors and outdoors.

There have been studies done to understand how a child adsorbs information. Howard Gardener wrote a book in 1983 called the Frames of Mind: The Theory of Multiple Intelligences that breaks down the understanding of how the mind operates and that there are 8 Multiple Intelligences that make up who we are and how we compute information. The 8 Multiple Intelligences are; Spatial, Bodily-Kinesthetic,

Musical, Linguistic, Logical-mathematical, Interpersonal, Intrapersonal, and Naturalistic. In his theory it is more about how well an individual computes information in different scenarios makes one person more of one type of intelligence than another. (Strauss, 2013) David Kolb wrote a book in 1971 on the Learning Styles Inventory and formed a company on experience based learning in 1981. His works describes children having 4 unique learning styles, Assimilating, Accommodating, Diverging, and Converging and most recently he has updated his research to have 9 styles, but for this research I will focus on the 4 original styles. (Kolb & Kolb, 2016)

Each of these methods in understanding a child's ability to absorb information has data on ways to improve the classroom experience for the student and the teacher, but they lack the physical environmental design.

There have been studies that show the connection between the physical environment and the benefits for the child mentally and physically, but much of the research is lacking in making the correlation between modalities of intelligence and designing for them in physical spaces.

My research is to begin to show the correlation between how a child absorbs information and how designing the physical environment to suit all of those modalities of intelligence can improve upon the student's education and overall wellbeing.

PROBLEM STATEMENT

In order to understand how to design for outdoor education in California primary schools, we must consider all of the aspects involved. Each student has different learning styles or intelligences which effects how they perform in a classroom. Many of the ways students learn are not conducive to traditional classroom settings leaving students behind and struggling. Progressive methods in teaching reaches more students due to the manner that the class is taught varies, but there are physical components in education that could be brought outside of the classroom into an outdoor educational space where all students can benefit.

First, I will address the student and how a student learns. Learning abilities refer to an individual's level of comprehension and to their capability to understand and profit from an experience. The difference between learning abilities and modalities of intelligence will be discussed. I will focus on modalities of intelligence, which includes; how a student processes information in learning situations, and the learning-style methods that can be applied will be outlined. The modalities of intelligence that will be focused on in this text are: the visual-aural/auditory-read/write-kinesthetic method (V.A.R.K.), the Multiple Intelligences method, and the Learning Styles Inventory method. These methods have inherent frameworks that provide a road-map to designing for modalities of intelligence within an educational environment and I will offer those connections in this study.

Secondly, will address the environment in which a student learns and discuss the historical relevance of the indoor classroom and how it has transformed the overall educational experience in the standard school design. These indoor classroom structures have evolved with pedagogical advances and an awareness of architecture that includes its effects on the overall experience. Many of these advances can be applied to outdoor classroom design and spaces for experiential learning. Making these connections and applying the abstract knowledge of the psychological and

physical requirements needed for students within a space will help to create a method for designing outdoor educational spaces to support student modalities of intelligence.

The students are the future leaders of tomorrow and understanding how a student's mind operates and absorbs information will help teachers and designers build a better environment that is more conducive to learning. Within the scope of modalities of intelligence there are abilities, disabilities and learning styles. Learning abilities refer to an individual's level of intelligence. A "learning disability" is a term to describe one or more cognitive disorders. The U.S. Department of Education defines a learning disability as:

> a child evaluated in accordance with Sec. Sec. 300.304 through 300.311 as having mental retardation, a hearing impairment (including deafness), a speech or language impairment, a visual impairment (including blindness), a serious emotional disturbance (referred to in this part as "emotional disturbance"), an orthopedic impairment, autism, traumatic brain injury, any other health impairment, a specific learning disability, deaf-blindness, or multiple disabilities, and who, by reason thereof, needs special education and related services. (U.S. Department of Education)

Learning abilities and disabilities have been quantifiably measured through testing and through grading systems. Schools provide classes and have placed special attention on those students both in the curriculum and in the design as required by the Federal, State, and District requirements for best instructional practices.

Research has investigated the functional capability and operation of individual cognition, mindful of a person's abilities, learning styles and intelligence. A learning style, on its own, can vary, according to the study, and our being able to differentiate the extent of one's learning behavior can be useful as a guide to further identify the student's capacity to learn. Often, research has noted, that an individual will have a mixture of learning styles.

With regard to learning styles and abilities, there are a few individuals whose work has been published concerning identification of such concepts. Howard Gardner is the John H. and Elisabeth A. Hobbs professor of Cognition and Education at the Harvard Graduate School of Education and is best known in educational circles for his theory of Multiple Intelligences, a critique of the notion that there exists but a single human intelligence that can be adequately assessed by standard psychometric instruments. Gardner states that education needs to function from two deeply rooted considerations: what is known about the human condition, and what is known about the pressures, challenges and opportunities of the contemporary scene. In The Disciplined Mind, Gardner outlines a method for the future of education and gives approaches to understanding the Multiple Intelligences that are inherent within every individual. The Multiple Intelligences perspective can enhance understanding of humans complex cognitive abilities in at least three ways: by providing powerful points of entry, by offering apt analogies, and by providing multiple representations of the central or core ideas of the topic (See Figure 5 and 6). (Gardner H. , 1999)

Figure 5. Diagram of the Multiple Intelligences theory. Detailed diagram showing the 8 different intelligences. http://www.connectionsacademy.com/Libraries/blog/multiple-intelligences-learning-styles.jpg.

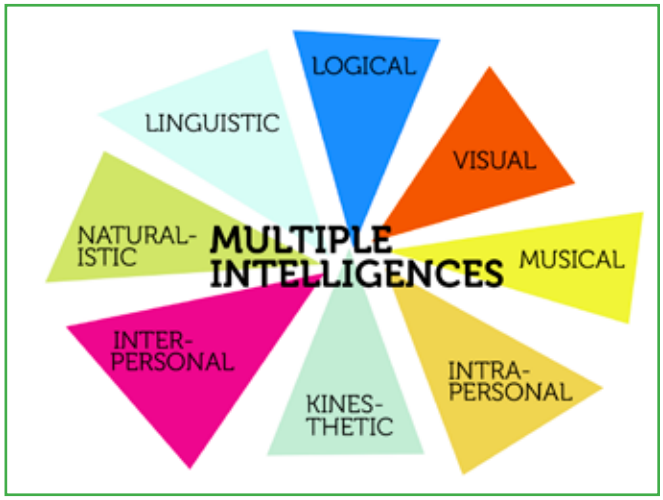


Figure 6. Diagram of the Multiple Intelligences theory. Diagram showing the 8 different intelligences. https://readnicole.files.wordpress.com/2011/05/multipleintelligences2.jpg

Charles Murray adopts Howard Gardner's Multiple Intelligences classification for abilities, discusses the seven intelligences of: bodily-kinesthetic intelligence, musical intelligence, interpersonal intelligence, intrapersonal intelligence, spatial intelligence, logical-mathematical intelligence and linguistic intelligence. He brings to light that with recognizing multiple intelligence classification, we must understand that half of the children studied function below average. (Murray Third Cover)

David Kolb was a professor of organizational behavior and management at the MIT Sloan School of Management and at the Weatherhead School of Management, and Case Western Reserve University where he is currently Emeritus Professor of Organizational Behavior. He is best known for his research on the Learning Styles Inventory and experiential learning that can be described in Experiential Learning: Experience as the Source of Learning and Development. A diagram of David Kolb's learning styles model and experiential learning theory (ELT) can be seen in Figure 7. Kolb wrote a book in 1984 describing the learning styles through a model that bridged studies of cognition that assisted in our understanding of human learning behavior.

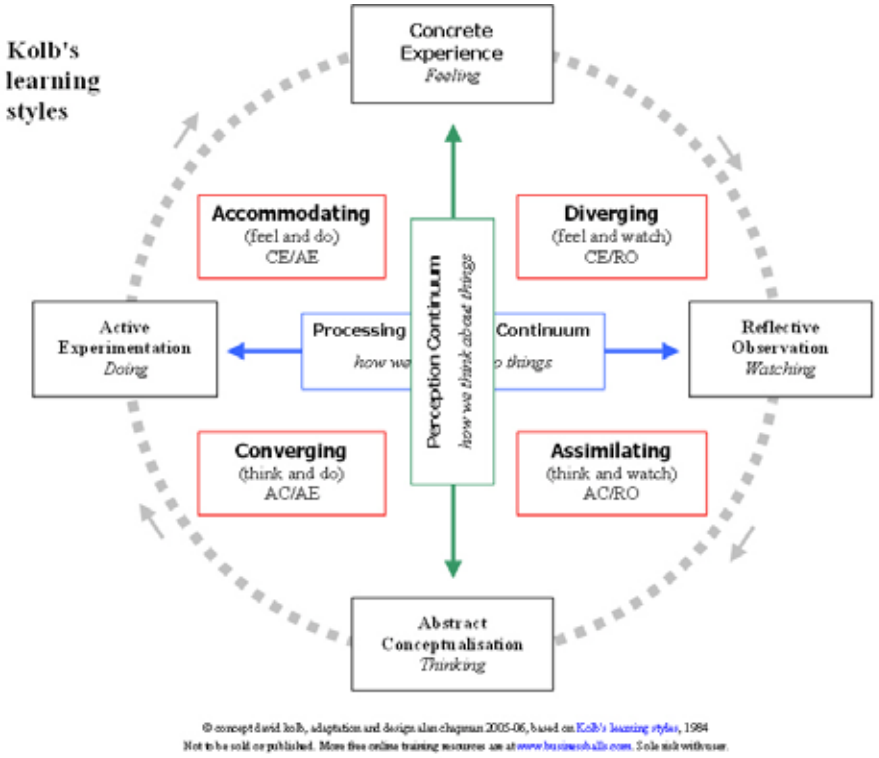


Figure 7. Diagram of the Learning Styles Inventory. Diagram of the 4 different learning styles; Accommodating, Diverging, Converging, and Assimilating. (Gardner, Chapman, & Kolb)

The visual-aural/auditory-read/write-kinesthetic method (V.A.R.K.) provides four sensory learning methods; visual – seeing, aural/auditory – listening and speaking, read/write – reading and writing, and kinesthetic – touching and doing (See Figure 8).

These different methods can all help to assess and determine the level and type of education required by the person in order to absorb information.

The relationship between the indoor classroom and the outdoor classroom can be determined by the teacher and the curriculum. The teacher's ability to teach and how they teach can affect each student differently. Curriculum in California is predetermined and distributed by the California Department of Education. In the California Code of Regulations under School Facilities Construction there are minimum standards set forth in the design of the school and requirements for the landscape. As stated previously, asphalt and turf are the only required implementations in the outdoor spaces. (California Department of Education Title 5)

Since the early 19th Century with the Common School movement and Horace Mann's classroom design, the blueprint for a classroom has remained mildly unchanged: standard rows and windows on either side of the room. Schools focus on what make the classrooms livable and conducive to learning in quantitative measures such as: ventilation, heating, cooling, lighting, and acoustics. All quantitative measures evolved and changed through history. (Baker 3)

Figure 8. Diagram of V.A.R.K. method. Diagram of the 4 different learning styles; visual, aural, read/write, and kinesthetic. http://teach.com/wp-content/uploads/2011/10/Learning-Styles.png

Ewart Arthur 'Red' Wetherill was a noted architect with a bachelors in architecture from the University of British Columbia and a masters in architecture at MIT. Wetherill became interested in architectural acoustics at MIT and taught at multiple universities. A detailed report was given on acoustics with Wetherill's article, "Classroom Design for Good Hearing", in which he discusses the noise level in a classroom and at what decibel it should be for students to effectively absorb the information. The design of an indoor classroom and where it's located in its surroundings effects the acoustical performance. The criteria for the acoustical performance can now be found in the American National Standards Institute published standard 12.60. (Wetherill) The article provides examples of ongoing acoustical problems in public schools and the results of substandard conditions. Optimal speech to noise ratio for normal hearing children is above 10 decibels and for hearing impaired above 15 decibels. Wetherill does connect acoustic decibels to classroom design and also the levels which are acceptable for normal hearing individuals as well as people with hearing disabilities or other disabilities which can make learning more difficult or nearly impossible due to the noise distractions.

In a recent study in 2015, more traction was made in connecting the qualitative data and physical results of testing for quantitative data by making the correlation that there are physical classroom features that can effect academic progress. The stimulation, individuality and naturalness conceptual model, or SIN Model, was used as a vehicle to study and organize the full range of sensory impacts experienced by an individual occupying a given space. (Barrett, Davies and Zhang) Within the study there were seven key design parameters that were identified: light, temperature, air quality, ownership, flexibility, complexity, and color. Naturalness consists of light, sound, temperature, air quality and links to nature. Individualization consists of ownership, flexibility and connection.

And stimulation is an appropriate level or measurement of complexity and color. In their study they made assessments of 3766 pupils in 153 classrooms in 27 schools. (Barrett, Davies and Zhang) It was found that the “naturalness design” principle accounts for around 50% of the impact on learning the other two utilities making up roughly a quarter each. The built environment factors on learning progress is said to be a major new finding, but that it is also non-trivial and can be isolated.

In identifying the connection between learning styles and outdoor environments, Doctor Habibe Acar from the Department of Landscape Architecture at Karadeniz Technical University in Turkey addresses children’s active learning in the outdoor spaces through his research. Doctor Acar claims that outdoor play environments have an impressive role in the development of a child’s overall education. In the past, learning was considered to be a passive activity, and now it is known, through research, that children can be active participants in their own learning. The environment in which children play should have ample equipment that allows for multiple activities and different learning opportunities.

According to Acar’s research, children experience the natural environment in three ways: direct, indirect and symbolic. Direct use of the environment gives the most opportunities for education because it enables learning by touching, seeing, hearing and experiencing. Children need to be actively using and exploring the environment. When designing outdoor learning environments for children, Acar states that there are three necessary constituents: the child’s perception and interpretation of the environment, the effects of the physical environment on children’s behavior, and the motivations behind children’s environmental interactions. In order to design for these three constituents one must know the child, what the child wants, and what the child can do in different age groups. Acar recommends using natural materials when designing in the natural environments as they have positive and important contributions to the learning and development of children. (Acar 846-853)

Finally, with the study on “Developing Conducive Sustainable Outdoor Learning” from the faculty of Engineering and Built Environment at National University of Malaysia, we see that outdoor education in the natural environment can provide opportunities to improve social and emotional intelligence and encourage academic achievement for students. The environment that outdoor learning provides is also conducive to studies in varying subject areas such as: science, training for sustainability and various green infrastructure systems, and learning with the senses. A successful outdoor design that engages with nature can be an important role to help promote student’s abilities such as academic achievement and social behaviors. (Mirrahimi, Tawil and Abdullah)

Understanding the modalities of intelligence and the indoor to outdoor classroom design are the two areas of focus in this study and with each provides new insight to designing for outdoor educational spaces.

There appears to be a lack in studies that correlate modalities of intelligence to design of classroom space whether it is indoors or outdoors. The quantitative data is more readily available with the most recent journal articles that have been published exploring the relationship between emotional intelligence and the impact that it has on learning.

PURPOSE STATEMENT & RESEARCH QUESTION

My research is in modalities of intelligence, outdoor education design and the methods for which the design is created. The interior design of the classroom was researched and the layout and methods for which it was decided historically was studied. The analysis includes the following: when and how often the outdoor classroom should be implemented; which type of design will recognize the diverse modalities of intelligence and be able to place more value in the education for the students; can we successfully demonstrate the effects of the environment on children and also improve their educational experience and future? The structure of the faculty and educators in the educational system was researched along with who makes the decisions on curriculum and environments.

We can be designing for outdoor learning spaces like we design indoor classrooms and have them be just as effective, if not better. Through research it was determined that designing for the different learning styles and abilities or disabilities within the landscape was not being done, and there is very little research making the correlation between the outdoor educational landscape and modalities of intelligence.

It appears that a student's abilities or learning styles have not been directly related to the layout and implementation of the classroom design. Such quantitative results and designs for ventilation, heating, cooling, lighting, and acoustics that have evolved through time could also resolve some of the sensory distractions that children experience through their varying learning styles and abilities or disabilities. The connection could have been made, but there was none.

It may be that outdoor educational spaces at California public schools are each a unique case, or site specific. Or it may be that a school utilizes the outdoor spaces for extracurricular activities that are only offered after school. How can we effectively design for modalities of intelligence in outdoor educational spaces within the California public primary school system and demonstrate the correlation between modalities of

intelligence and the surrounding environment?

I also probed the following questions. Can we design spaces for students that provide them with the best tools and methods by which they may understand and comprehend the curriculum? Are we designing spaces for and with the intention of supporting and engaging students through their various learning styles, abilities and disabilities?

What I accomplished with my research is the need for outdoor education in California public schools and how students and their surrounding environment can be affected by their ability to absorb information due to modalities of intelligence. Through chosen research methods and site analysis my goal is to come up with an effective design for all modalities of intelligence in outdoor educational spaces.

RESEARCH DESIGN, METHODS, & DATA COLLECTION

In designing for outdoor educational spaces that appeal to all modalities of intelligence, we must fully understand the needs of a student by factoring in the differentiation of their educational environment and resourcing. Understanding the student and the indoor to outdoor classroom design are the two areas of focus in this study.

The need for outdoor education and extending the curriculum outside of the standard classroom was assessed through previous case studies, research, surveys and observations within the classroom and school. I implemented these methods to help determine, on a local level, the need for outdoor education in our primary schools.

In dealing with California public schools, there was more time given to the preparation of implementing surveys and onsite interactions with the faculty and students. Permission to perform activities for an individual school required reaching out to the faculty far in advance. When performing the survey for this research I determined the appropriate channels to receive acceptance of administering the survey.

Due to the level of interaction with the school involved in this research I concluded that it would be timely and economical for the site to be within driving distance. The project site was Whitehead Elementary School.

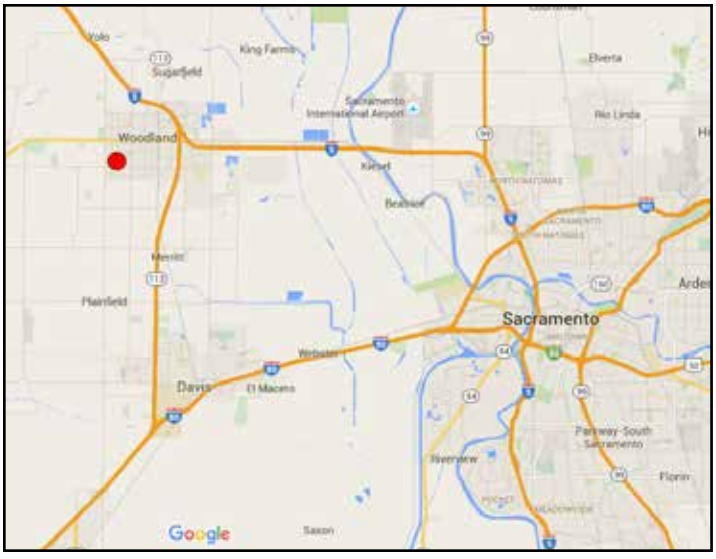


Figure 9. Map of Woodland, CA. School site is the red dot. (Google Maps, 2016)

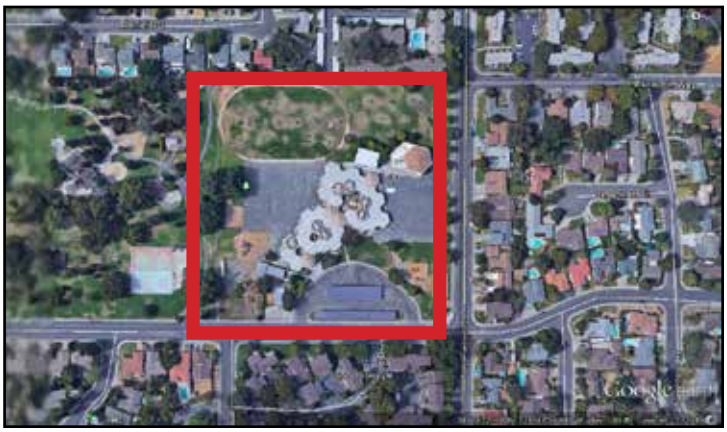


Figure 10. Aerial of Whitehead Elementary School in Woodland, CA. School site is outlined in red. (Google Maps, 2016)

Whitehead Elementary school is located on the west side of Woodland, California (See Figure 9 and 10). Total student body is 423 and faculty is 19. The student body ethnicity is primarily Latino (See Figure 11). There are a staggering number of English language learners (ELL) at 49.6%. (Los Angeles Times, 2013) I observed that, during a normal school day, there is a point in time when the teacher excuses the ELL's to go to another classroom to receive a dedicated instruction. The campus area is made up of; buildings at 45,000 square feet with 11% of the total area, asphalt at 112,400 square feet with 28% of the total area, playground spaces at 16,500 square feet with 4% of the total area, the turf and green spaces at 213,000 square feet with 54% of total area, and the garden space at 10,000 square feet with 4% of total area (See Figure 12).

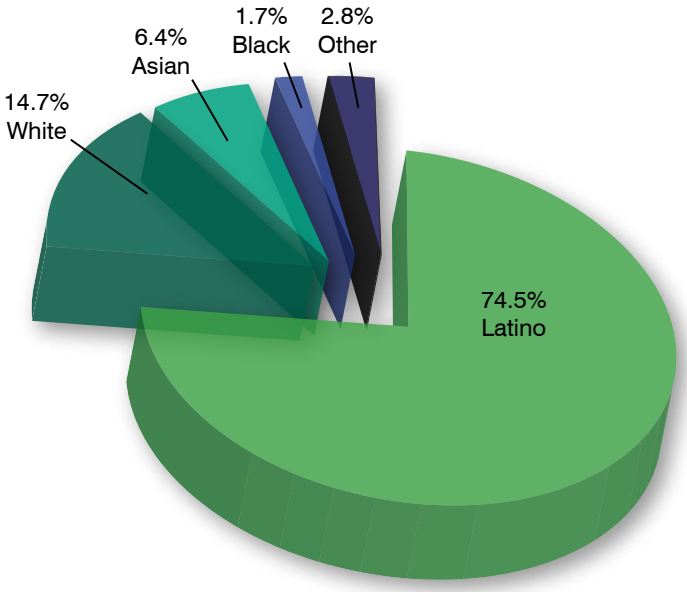


Figure 11. Ethnicity Pie Chart. Whitehead Elementary School Ethnicity percentages of Student Body. Data from (Los Angeles Times, 2013). Remitz, L.

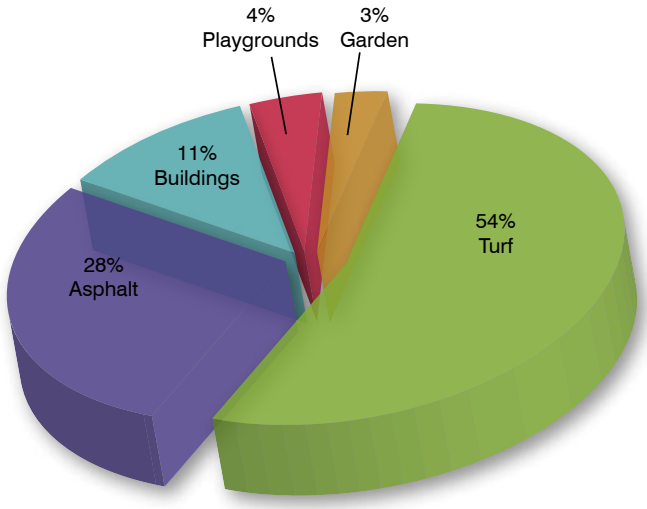


Figure 12. Total Area Pie Chart. Whitehead Elementary land use percentages of total area. Remitz, L.

The location, size, and proximity of the buildings to the asphalt is what is concerning. On average, a student would have to walk 80 feet from a classroom door to not be on asphalt. The monthly average temperatures for the City of Woodland is in Figure 13. Even though the highest temperatures for the year are when school is not in session, the average high temperatures for when it is can be over 100 degrees Fahrenheit. This also is reflected in the survey I distributed amongst the faculty. The faculty responded in the survey that the number one reason for not bringing students outside of the classroom is weather and the heat (See APPENDIX C: SURVEY QUESTIONS & RESULTS Question 7 & 9). The closest tree canopy to the classrooms is just less than 200' away from the building and there is no seating available outside of the classrooms other than the designated outdoor lunch space next to the cafeteria (See Figure 14). The only vegetation outside of the garden are the trees that are sporadically placed and also lined down the exterior fence, and the turf areas.

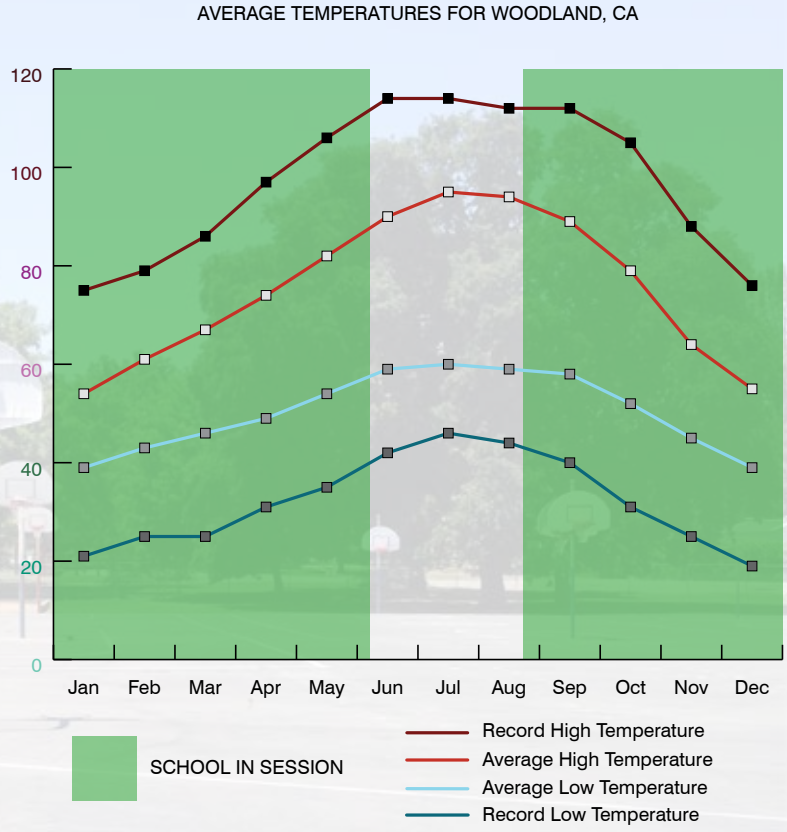


Figure 13. Average temperatures for Woodland, CA. Showing the school year in green. Data sourced from https://weather.com/weather/monthly/l/95695. Remitz, L.

Figure 14. Outdoor tables photo. Whitehead Elementary outdoor eating area. Remitz, L.

I was able to intern at Whitehead Elementary and make in-class observations, distribute a survey out to the faculty and staff, and work directly with the volunteers in the school garden. The observations helped me to understand the day to day operations within the classroom and school grounds. The internship allowed me time with the students and to determine what type of instruction was being given.

I attended a 4th grade classroom and logged 30 hours of time assisting the teacher as needed with instruction, grading papers, and testing. Volunteering for the classroom gave me a chance to observe the current curriculum and how it is taught. There was a set schedule of subject matter taught and at specific times in which they would receive that instruction. The classroom could be considered more progressive considering the teacher allowed for group work, collaboration, varied seating arrangements, student taught lectures, and character development (See Figure 15).

The teacher allowed for instruction outside of the classroom when the students had the English Language Arts (ELA) portion of the day. The students would grab a chair and go a short distance outside of the classroom to read aloud from a book and take turns at reading. When participating in this activity I noticed that the students remained focused on the material even when other classes were let outside for recess and the students in my class remained. They showed much enthusiasm for the material and the storyline to keep focused, plus the freedom of working together gave the students confidence in speaking aloud. For this exercise, the students would choose to place their seats under the eaves of the building to be in shade (See Figure 16).

Figure 15. Classroom photo. Whitehead Elementary 4th grade classroom. Remitz, L.

Figure 16. Outside of classroom photo. Whitehead Elementary outdoor shaded space. Remitz, L.

During the morning physical education time, the teachers brought the same grade levels together and had them bounce a basketball back and forth while side stepping down the basketball courts. It was also observed that the teachers had the students run around the track on the north end of the site for physical education. I approached teacher during a recess and discussed the use of the outdoor spaces. A large portion of the asphalt has tetherball poles with chains dangling from the top of the poles. According to the faculty, the tetherball poles were no longer used. An opportunity for design is to utilize the asphalt spaces that are not being used and to create more permeable spaces where outdoor education can occur and in turn eliminate much of the heat island effect happening from the asphalt (See Figure 17 and 18). Another opportunity is the interior courtyard spaces. Within the main building are three courtyard spaces that are otherwise dead space used currently as a pathway between classrooms and facilities. These courtyards could be used for quiet reading spaces, breakout spaces for the classes, or exterior break rooms for the faculty.

The playground structures were either old, outdated or lacking materials for it to be entirely successful (See Figure 19). I observed that there was one large map of the United States painted onto the asphalt. Since there was nothing to break up the sight lines all the way to the street, I could see how easily a student could be distracted by movement or noise that travels across the asphalt.

Figure 17. Asphalt area photo. Whitehead Elementary west view of basketball area. Remitz, L.

Figure 18. Asphalt area photo. Whitehead Elementary asphalt area showing unused tetherball poles. Remitz, L.

Figure 19. Playground area photo. Whitehead Elementary southwest playground area.

Observations also came from attending the after school garden program and volunteering my time to help with the maintenance and instruction within the garden. When I volunteered at the garden, it was primarily an after school program on Friday afternoons. The person in charge of the garden was a parent of students that attend Whitehead and is passionate on keeping the garden maintained and a having it be a place of education for the students. There is a deck that has a pergola covered in overgrown Wisteria that the school uses as an outdoor classroom. It has short benches on the perimeter of the deck that is still under the coverage of the pergola. In order to gain access to the deck you would have to step over the benches, which can be an inconvenience (See Figure 20).

The garden space is roughly 10,000 square feet and one third of that space has raised garden beds (See Figure 21 and 22). The garden area is maintained solely by the volunteers and the after school programs at Whitehead. There is currently no curriculum or precedence to bring classes out to the garden while school is in session. The garden is surrounded by 6' chain link fencing that appeared to be locked until the parent in charge of the program unlocked it for the after school program on Fridays.

It is with the time both in the classroom and in the garden where all of my observations solidified the existing conditions at Whitehead Elementary and documented the opportunities and constraints. Observations and volunteering helped me to develop a relationship with the school and in the end strengthen my problem statement.

Figure 20. Garden area photo. Whitehead Elementary garden view showing pergola. Remitz, L.

Figure 21. Garden area photo. Whitehead Elementary garden's tables and planting beds. Remitz, L.

Figure 22. Garden area photo. Whitehead Elementary garden's planting beds. Remitz, L.

I surveyed the faculty and staff at Whitehead Elementary to gather data on outdoor spaces; how the faculty utilizes them; how many teachers have instructed outside of the classroom; and what is the constraints involved with the project site and implementing outdoor educational spaces. I used an online survey website called Survey Monkey to collect the faculty responses. The link for the survey is https://www.surveymonkey.com/r/YBMJR92. There were a total of 10 questions for the faculty and there were 11 responses. A two week period was given to allow for the optimum number of responses. The questions and answers are listed in Appendix C.

I created a model where I could show the existing conditions of the site and demonstrate the mathematical nature of the building with its hexagon pattern. The model was also useful in helping with understanding the scale of the opportunities and constraints (See Figures 23-29).

Once all the data was gathered I translated that data into mapping that was used to formulate a design. The full outline of the research can be seen in Appendix A: Scope of Work.

Figure 23. Existing conditions model photo. Whitehead Elementary model building. Remitz, L.

Figure 24. Existing conditions model photo. Model trees being constructed. Remitz, L.

Figure 25. Existing conditions model photo. Model trees being constructed. Remitz, L.

Figure 26. Existing conditions model photo. Plan view of Whitehead Elementary model. Remitz, L.

Figure 27. Existing conditions model photo. Entrance to Whitehead Elementary. Remitz, L.

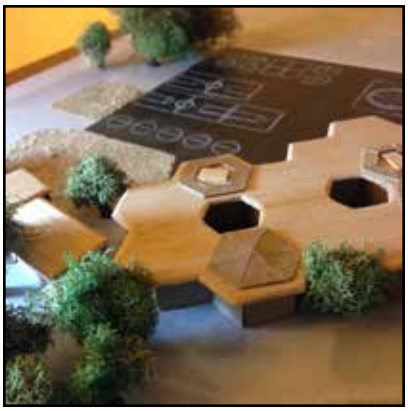


Figure 28. Existing conditions model photo. Asphalt and building view of Whitehead Elementary Model. Remitz, L.

Figure 29. Existing conditions model photo. Garden view of Whitehead Elementary model. Remitz, L.

DESIGN INVESTIGATION & ANALYSIS

My original design was to synthesize the modalities of intelligence that were studied to help formulate the final design. I found that the synthesis was unable to take place at this time due to the complexity of methods in which were studied and also how different the modalities are. Further research is required for a synthesis of the modalities of intelligence. However, the V.A.R.K. method could be used to demonstrate how each of those learning styles/senses are used or not used in the classroom and with that I was able to formulate needed components within the landscape.

Breaking down V.A.R.K. into each style, I documented the observed indoor classroom activities and the tools used. With that I was able to make some design choices on opportunities for elements in the landscape that would appeal to all of the V.A.R.K. learning styles (See Table 1).

Table 1
V.A.R.K. Activities, Tools, and Elements Table. Listed observed activities and tools used in the classroom for educational purposes and providing opportunities for outdoor educational landscape elements.

	Visual 	Aural 	Read/Write 	Kinesthetic 
Observed Indoor Classroom Activities	Whiteboard writing for math problems, visual graphics, projector usage.	Group work, recordings/ sounds, lectures, reading aloud. (Traditional Classroom)	Reading aloud to each other, quiet reading time, narrations, whiteboard writing, art time.	Creating models, art time, students participating in teaching.
Observed Indoor Classroom Tools	Whiteboard, projector, handouts, paper/ writing surface.	Books.	Books, handouts, whiteboard, writing utensils, paper/writing surface.	Paper/writing surface, whiteboard.
Opportunities for Outdoor Landscape Elements	Chalkboard surfaces, painted mapping, color coded wayfinding, nature-play.	Vegetative screening, bird attractants, sound system, collaboration spaces, seating.	Chalkboard surfaces, quiet reading areas, seating, tables.	Nature play, garden space, native creek learning area, movable building blocks/seating.

Source: Remitz, L

Using the V.A.R.K. method, the California education standards on curriculum, and the site analysis I determined that in order to be a successful educational landscape there would need to be three areas or goals. Those three goals for the landscape are collaboration, quiet and free spaces (See APPENDIX D: DESIGN PROCESS).

The new design and implementation of the three goals of collaboration, quiet and free are color coordinated both in the graphical impression and also will be used in the landscape as a means of wayfinding for the students and faculty. Purple is for the Collaboration node, blue is for the Quiet node, orange is for the Free node (See Figure 30).

Each node has correspondong elements that were determined through my research with the V.A.R.K. method, site analysis, and previous case studes. Inspiration came from the opportunities on the site, historical aspects on the surrounding region, and through my observations and direct interactions with the students (See Figure 31, Figure 32 and APPENDIX D: DESIGN PROCESS).

Figure 30. Node bubble diagram. The three nodes of Collaboration, Quiet and Free, were placed into the landscape with keeping circulation, connectivity and interaction in mind. Remitz, L.

Figure 31. Example of outdoor classroom. A blackboard and varied seating allows for students to collaborate. VMDO Architects. http://www.vmdo.com/project.php?ID=4

Figure 32. Example of nature play. Logs and cut wood can become a learning playground for the young minds. Cottesloe Playgroup and Scouts May 2014 by Nature Play Solutions. https://www.pinterest.com/pin/316377942546461079/

The main building for instruction is made up of individual hexagon shapes and the building hexagons' creates a honeycomb pattern. I saw this as an opportunity for design and to bring pattern into the ground plane. The outline of the pathways in front of the classrooms follows the design of the building.

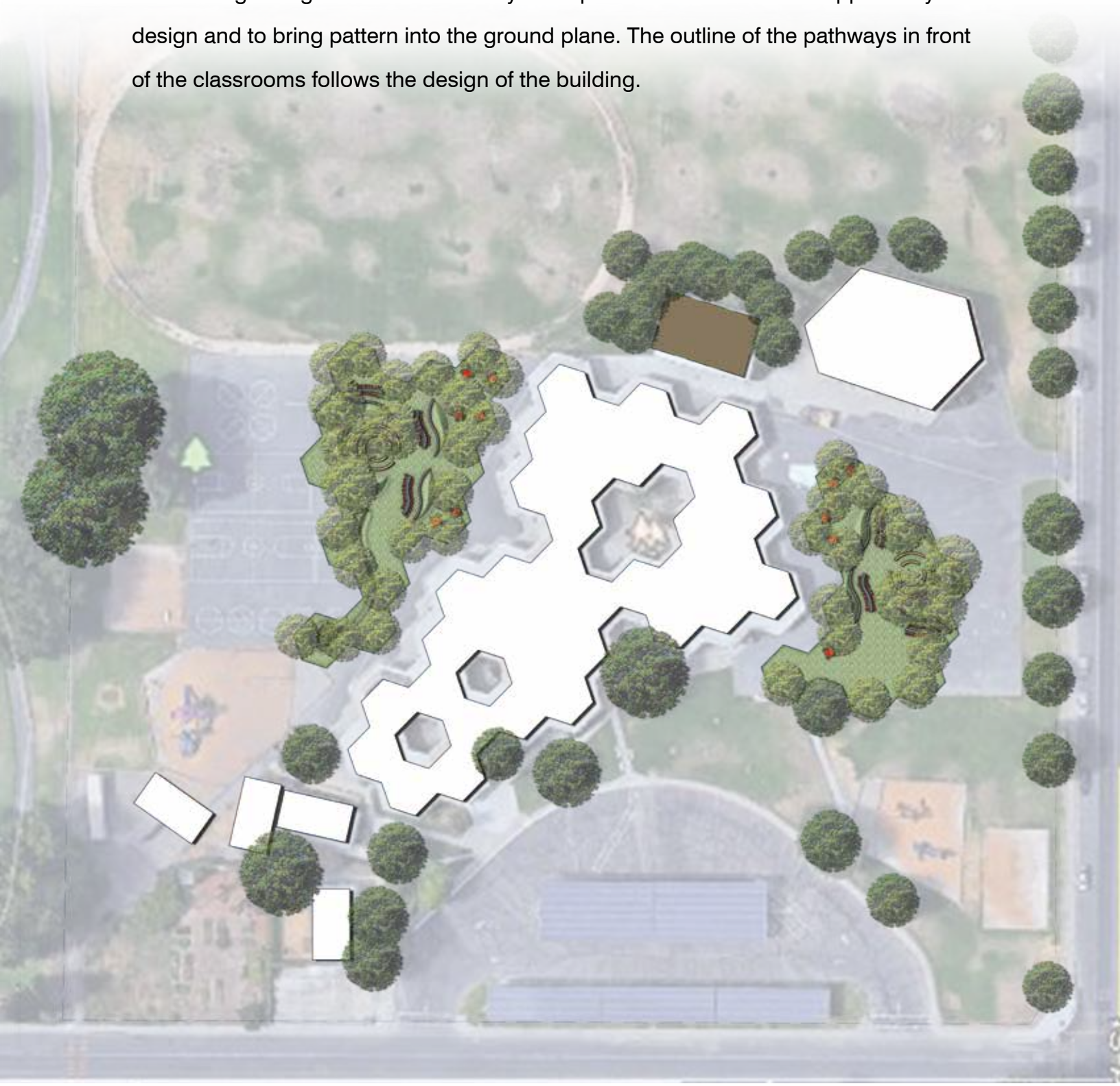


Figure 33. Final site design. Site design incorporates the three nodes of collaboration, quiet and free space. Each node has multiple elements that have been implemented to satisfy the analysis done with the V.A.R.K. learning style method, site analysis and my research. Remitz, L

Earth mounds were designed into the space so that students can either sit and read in the Quiet node or on another mound face the amphitheater and participate in group discussions. Tables were added to the design for seating and writing spaces in the Quiet node. Trees with a lower canopy cover the Quiet node so as to create a sense of intimacy. Long tables were added to the collaboration space that have chalkboard surfaces for the students to use for writing. The stools for the chalkboard tables are movable and allow for students to create their own space. Along with chalkboard surfaces on the tables, there are chalkboard walls next to the tables for group work to be done (See Figure 31).

In the center of the design is a circular amphitheater for the students to have entire class lectures, group discussions or share time.

For the Free node there is a bioswale with native plantings for students to explore and experience nature. Logs and wood are used to create natural seating, bridges and play structures (See Figure 32).

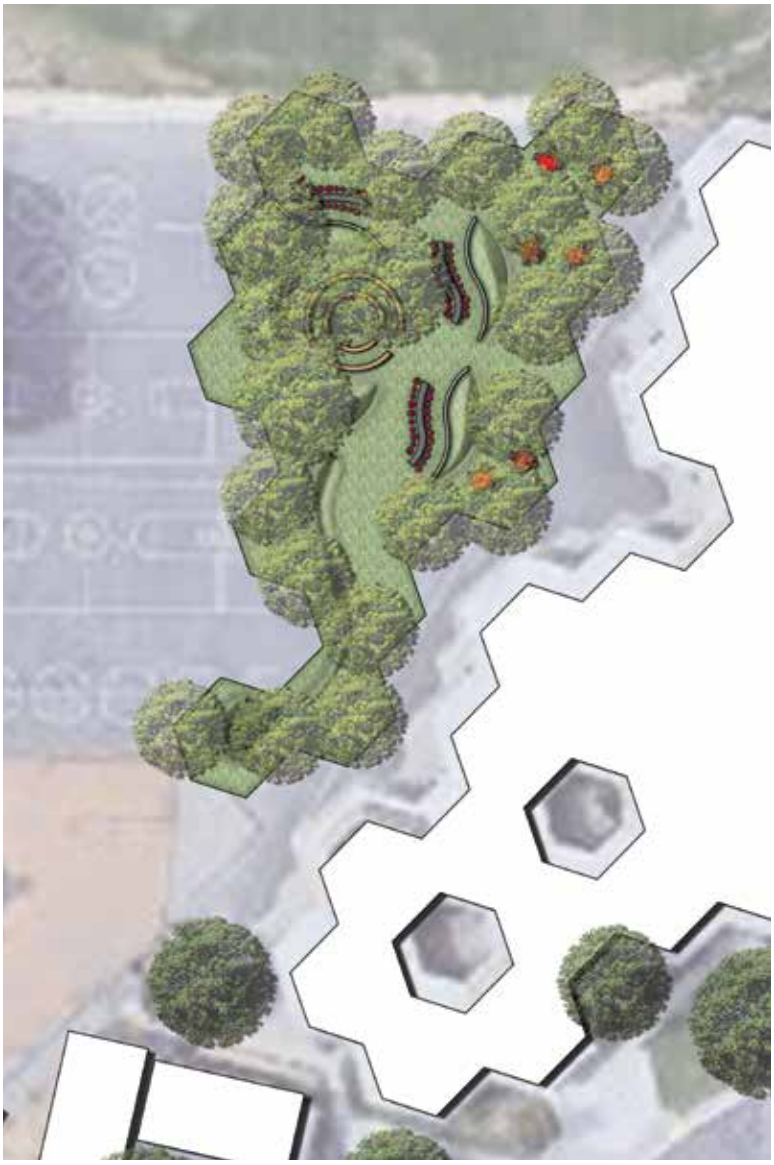


Figure 34. Final site design enlargement. Site design incorporates the three nodes of collaboration, quiet and free space. West side view of Whiteheat Elementary. Remitz, L

REFLECTION & CONCLUSION

Outdoor educational spaces in California public schools should be more prevalent. There have been many advances in indoor classroom design and making for more conducive learning environments and yet the California Educational Code does not have outdoor educational spaces as being mandatory in designing schools and outdoor spaces. The recent studies done on outdoor educational spaces and environments that support learning for students have returned information that is in a positive direction for solidifying the need for these spaces. However, with the research available, little correlation has been made with designing for all modalities of intelligence in outdoor educational spaces.

Through the research design methods and data collection outlined, I demonstrated those connections in designing for students with all modalities of intelligence in California public schools and in the end help make a design that reflects my research in education design. I was unable to perform my original goal of synthesizing all of the modalities of intelliegnece that was research in this study due to each modality of intelligence offering very unique methods in which to outline abilities, intelligence and learning styles. All of these modalities are so unique that the combination, or synthesis, was unable to be performed at this time.

It was with my observations within the 4th grade classroom that I gained much of the information I needed to complete a design that could be successful for Whitehead Elementary School in Woodland, CA.

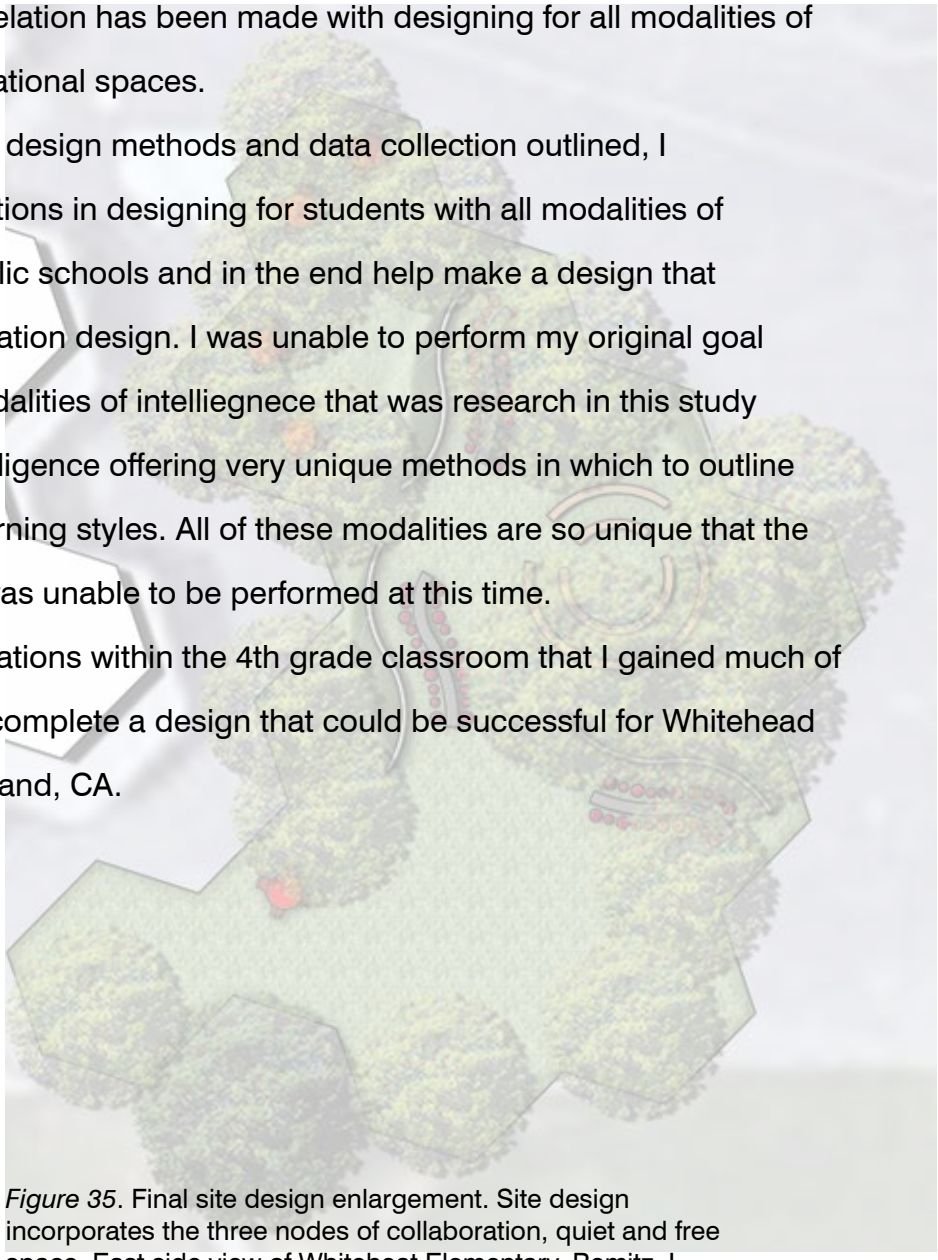


Figure 35. Final site design enlargement. Site design incorporates the three nodes of collaboration, quiet and free space. East side view of Whiteheat Elementary. Remitz, L

APPENDIX A: SCOPE OF WORK

SCOPE OF WORK

The project scope is the project kick-off, site evaluation, project program elements, and construction documents for Whitehead Elementary in Woodland, California.

Key components of the project scope include the following:

- Perform observations and surveys with the students and faculty.
- Determine existing conditions and evaluate data and results from surveys.
- Determine program project elements.
- Provide graphic designs and details.

TASK BY TASK

TASK 1 - PROJECT KICK-OFF

1.1 Meet with school principle and faculty, including maintenance staff, to review scope/schedule/goals for the Master Plan, gather existing information, and discuss deliverables.

1.2 Meet with students and teachers and perform surveys and in-class observations.

1.3 Establish scaled base sheet of the campus indicating limits of work.

SUMMARY

Task 1 Meetings:

1. One (1) Independent Project Advisor Meeting
2. One (1) Classroom Internship/Volunteer Meeting
3. One (1) Principal/Faculty Meeting

Task 1 Deliverables:

1. One (1) Campus base sheet and observations notes.
2. One (1) Survey distributed on a website to Whitehead faculty.

TASK 2 – SITE EVALUATION

The Site Evaluation phase will consist of a site visit and campus landscape area assessment:

2.1 Campus Landscape:

.1 Photograph each planting area/campus zone under consideration for education design.

.2 Record site project existing plantings and vegetation.

.3 Record site project existing land use and building classroom layout.

2.2 Statistics and Data:

.1 Record existing statistics on the student body and faculty.

SUMMARY

Task 2 Meetings:

1. One (1) Independent Project Advisor Meeting
2. One (1) Classroom Internship/Volunteer Meeting

Task 2 Deliverables:

1. Diagram illustrating existing landscape conditions and land use.
2. Diagram of building classroom layout.
3. Charts and spreadsheets of existing statistics on student body and faculty.

TASK 3 - PROJECT PROGRAM ELEMENTS

3.1 Develop nodes for the synthesized modalities of intelligence unique to the project site.

3.2 Prepare node matrix by use/zone with plant choices relative to conditions, microclimates, use patterns, and campus function.

3.3 Prepare campus-wide zone diagram with character photo references for program element recommendations for each node.

SUMMARY

Task 3 Meetings:

1. One (1) Independent Project Advisor Meeting
2. One (1) Classroom Internship/Volunteer Meeting

Task 3 Deliverables:

1. One (1) Synthesized Node Matrix
2. One (1) Project Element Diagram with associated character photos.

TASK 4 - DESIGN DEVELOPMENT

4.1 Involves further graphic development of planning and design. Modifications of original plan may occur. This serves as a draft for the design.

SUMMARY

Task 4 Meetings:

1. One (1) Independent Project Advisor Meeting
2. One (1) Classroom Internship/Volunteer Meeting

Task 4 Deliverables:

1. Draft of final designs and research

TASK 5 – FINAL DESIGN & PRESENTATION

5.1 Produce the final design and supporting graphics.

5.2 Meet with the school and give a presentation on final drawings.

SUMMARY

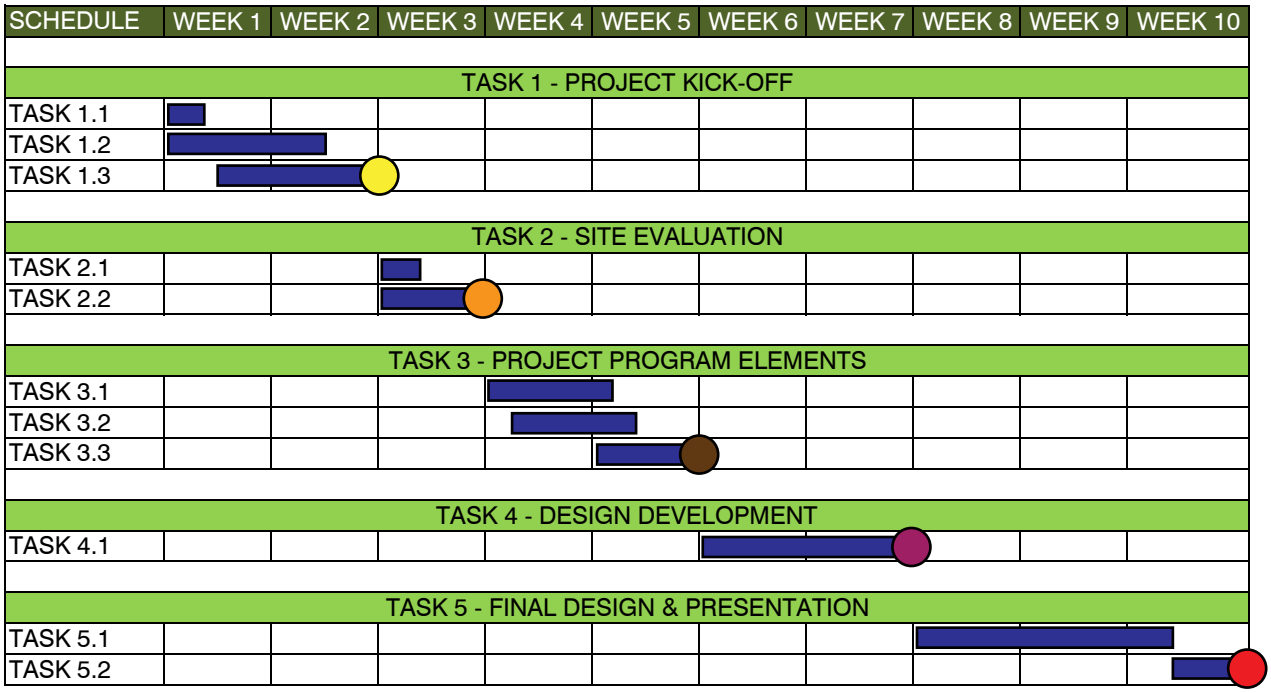
Task 5 Meetings:

1. One (1) Independent Project Advisor Meeting
2. One (1) Classroom Internship/Volunteer Meeting

Task 5 Deliverables:

1. One (1) Rendered Conceptual Site Plan
2. Two (2) Perspectives
3. Two (2) Rendered Section Elevations

APPENDIX B: TIMELINE



DEADLINES

TASK 1 - PROJECT KICK-OFF
MONDAY APRIL 11TH

TASK 2 - SITE EVALUATION
MONDAY APRIL 18TH

TASK 3 - PROJECT PROGRAM ELEMENTS
MONDAY MAY 2ND

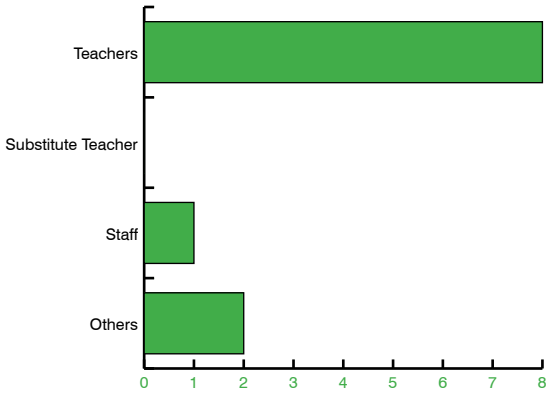
TASK 4 - DESIGN DEVELOPMENT
MONDAY MAY 16TH

TASK 5 - FINAL DESIGN & PRESENTATION
FRIDAY JUNE 3RD

APPENDIX C: SURVEY QUESTIONS & RESULTS

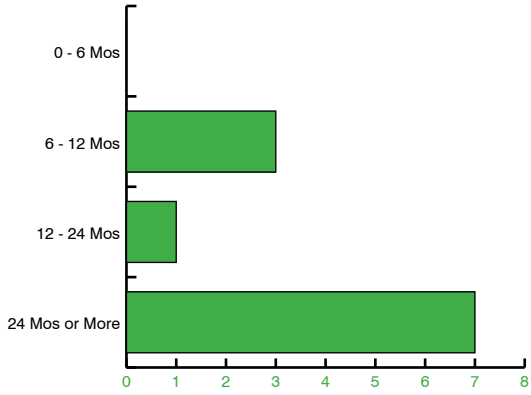
Question 1: Are you a teacher, substitute teacher, staff member or?

Answers:



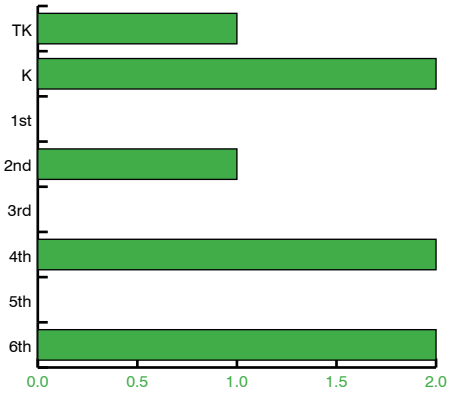
Question 2: How long have you worked for Whitehead?

Answers:



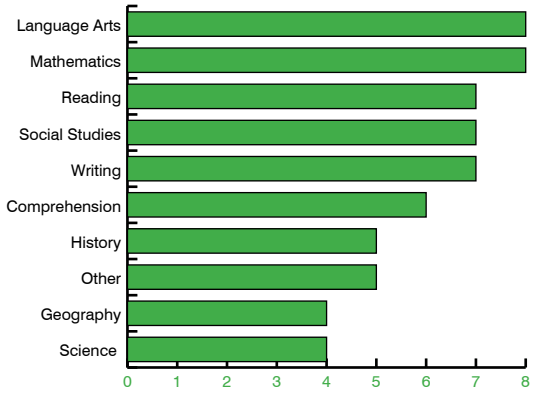
Question 3: If you are a teacher, what grade level do you teach?

Answers:



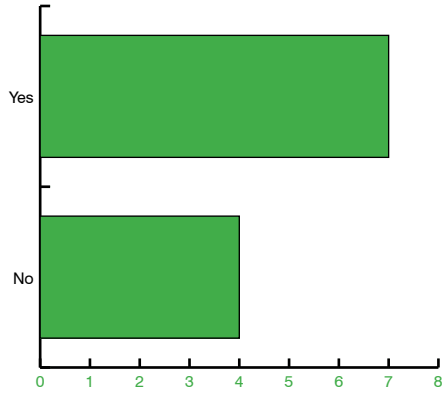
Question 4: If you are a teacher, which subjects do you teach?

Answers:



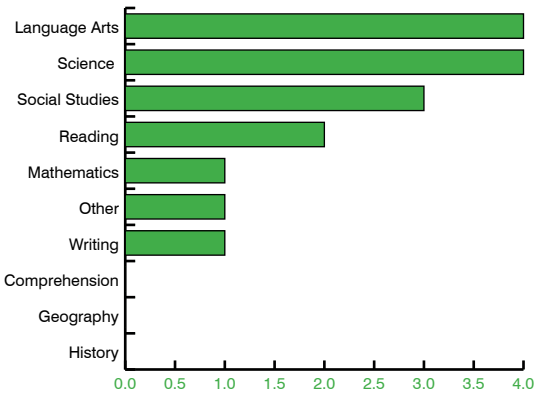
Question 5: Have you brought your students outside of the classroom to instruct on one or more subjects?

Answers:



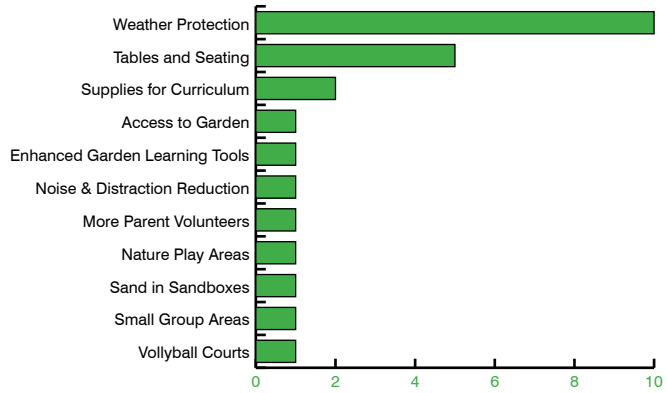
Question 6: Which subjects did you teach outside of the classroom?

Answers:



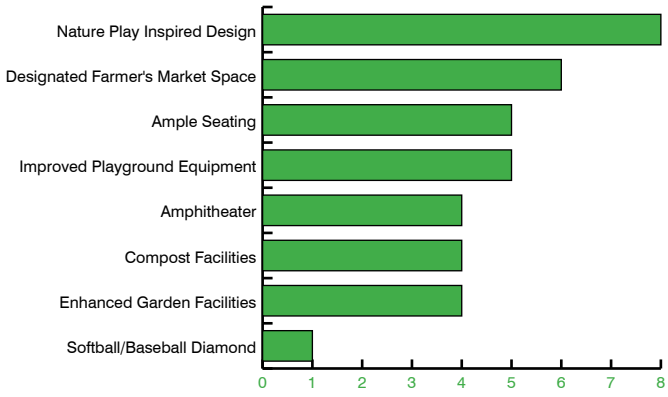
Question 7: If you were to say that the outdoor spaces at Whitehead needed something for you to teach more effectively outside of the classroom, what would those items be, if any?

Answers:

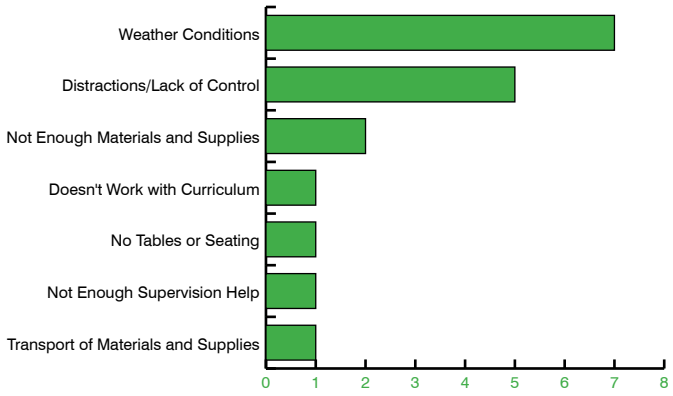


Question 8: Which of the items listed below would you like to see designed into the outdoor spaces at Whitehead?

Answers:

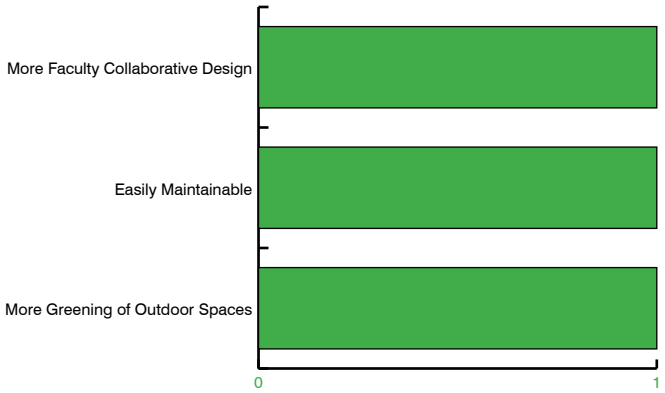


Question 9: What are some reasons, if any, why you wouldn't bring students outside to learn?



Question 10: Do you have any suggestions or considerations with designing the outdoor spaces at Whitehead?

Answers:



APPENDIX D: DESIGN PROCESS

Figure 36. Creating nodes. Documented the needed elements for a successful V.A.R.K. design in the outdoor landscape. Remitz, L.

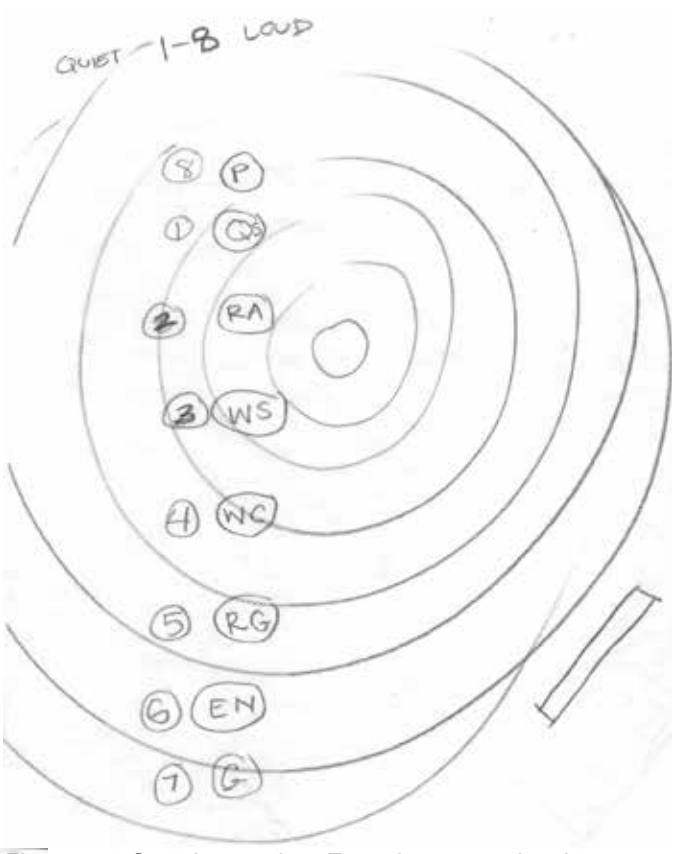


Figure 37. Creating nodes. Found a way to begin organize the elements according to level of noise. Remitz, L.

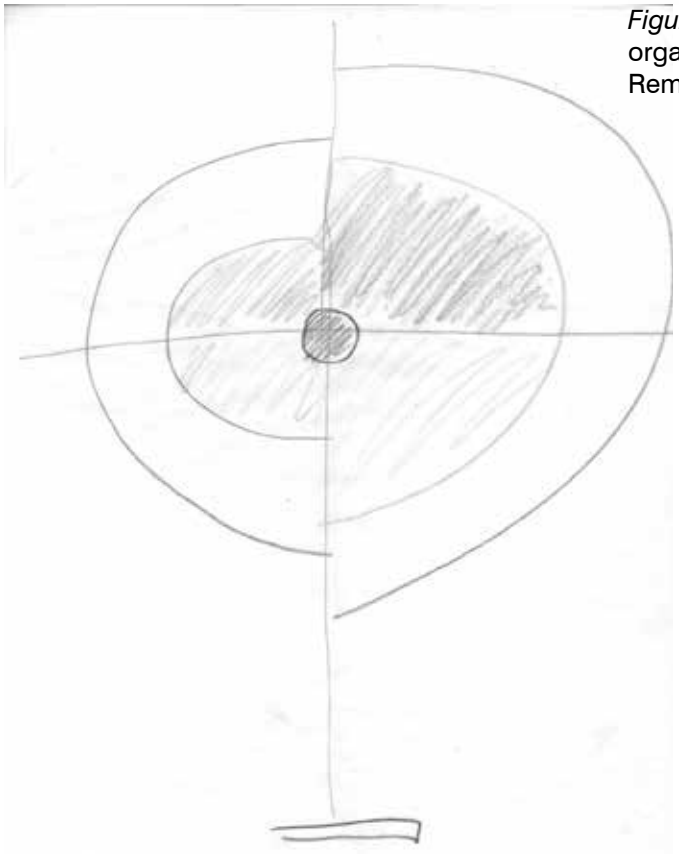


Figure 38. Creating nodes. Went back to first diagram and found a similarity with noise level and type of element. Remitz, L.

Figure 39. Creating nodes. Finalized 3 goals/nodes for the design; Quiet, Collaborative, and Free. Remitz, L.

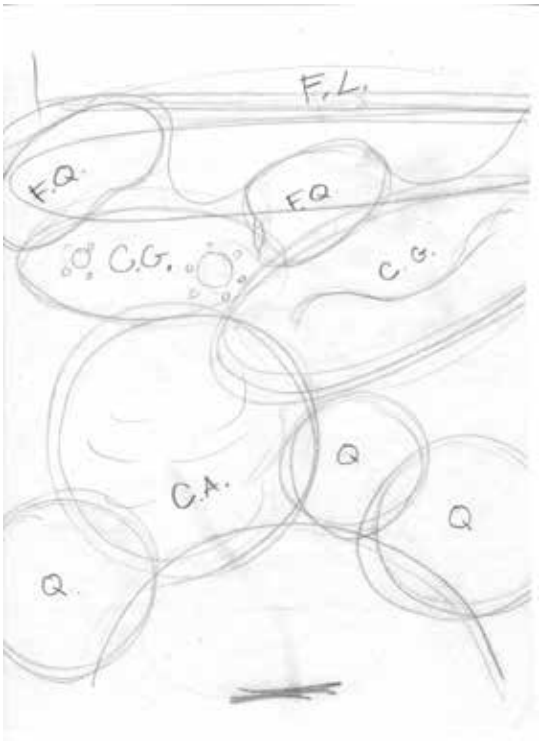


Figure 40. Bubble diagrams with nodes first draft. Sketches of nodes and working with scale of outdoor spaces and how they relate to one another. Remitz, L.

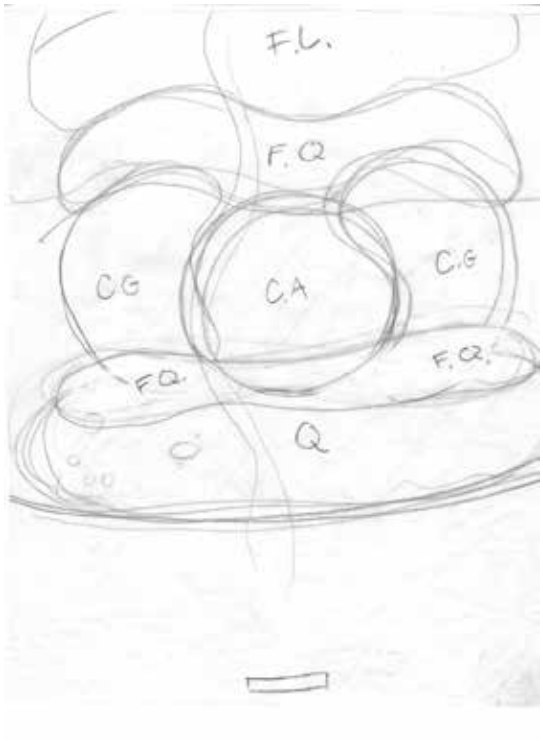


Figure 41. Bubble diagrams with nodes second draft. Sketches of nodes and working with scale of outdoor spaces and how they relate to one another. Remitz, L.

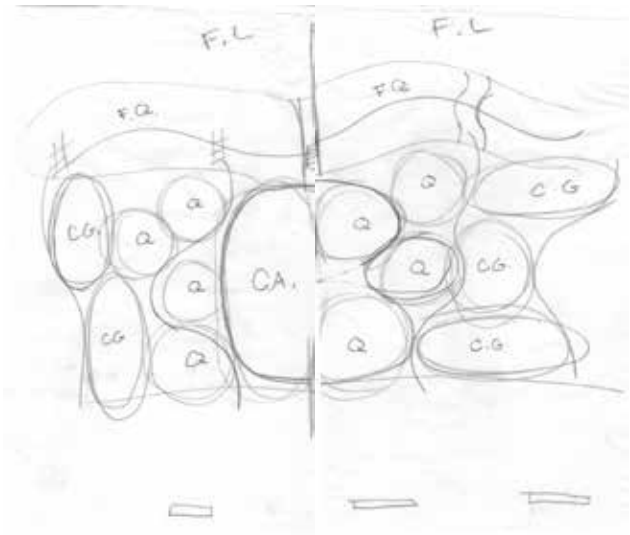


Figure 42. Bubble diagrams with nodes third draft. Sketches of nodes and working with scale of outdoor spaces and how they relate to one another. Remitz, L.

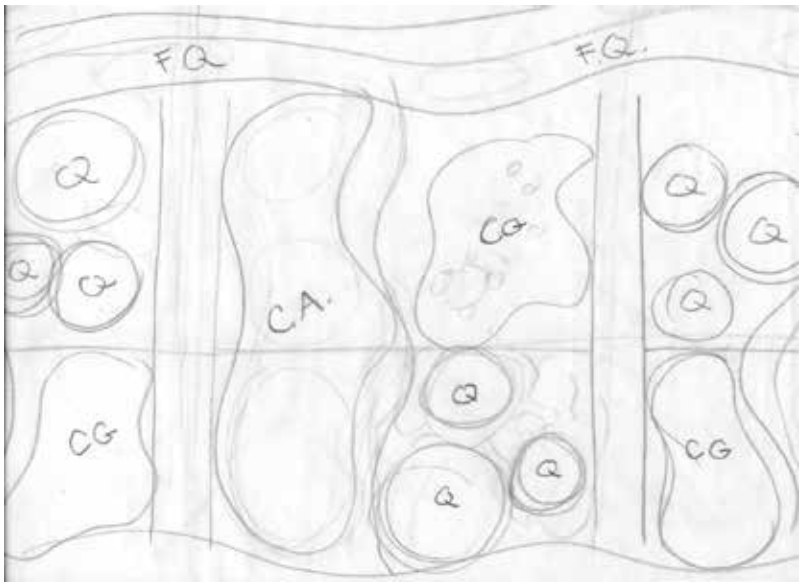


Figure 43. Bubble diagrams with nodes final draft. Sketches of nodes and working with scale of outdoor spaces and how they relate to one another. Remitz, L.

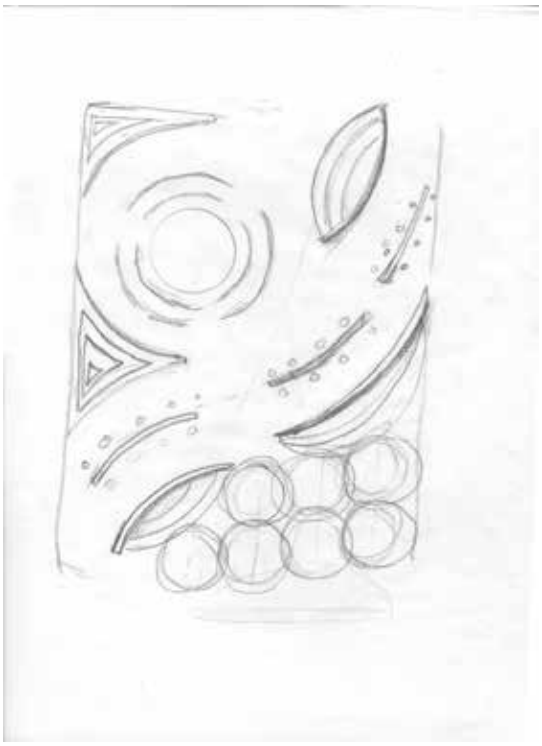


Figure 44. Design of elements draft 1. Sketches of elements and working with scale of outdoor spaces and how they relate to one another. Remitz, L.

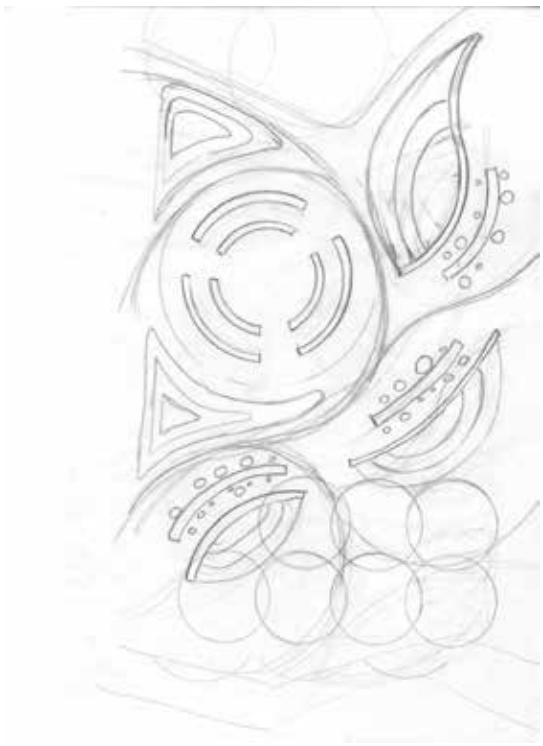


Figure 45. Design of elements draft 2. Sketches of elements and working with scale of outdoor spaces and how they relate to one another. Remitz, L.

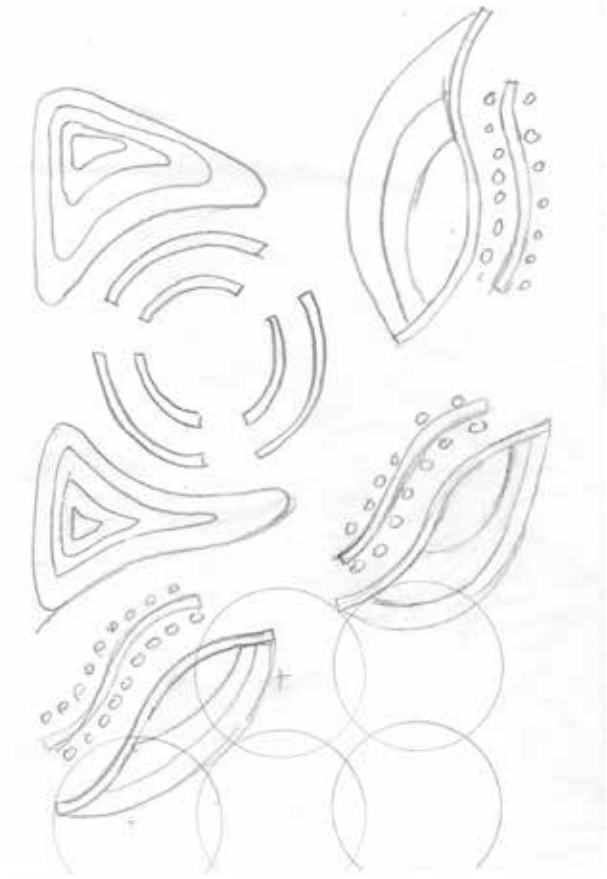


Figure 46. Design of elements final draft. Sketches of elements and working with scale of outdoor spaces and how they relate to one another. Remitz, L.

Figure 47. Example of play agricultural structure. An old silo was converted into a play structure for children. Produced by Berliner. http://www.berliner-seilfabrik.com/en/rosten-statt-rasten/

Figure 49. Example of seating made from agricultural equipment. Old ag. equipment was converted into a table. https://www.pinterest.com/pin/475552041879311608/

Figure 48. Example of movable seating. Red squares can be moved into any position. Spontaneous Interventions: Design Actions for the Common Good. http://mimizeiger.com/spontaneous-interventions-design-actions-for-the-common-good/

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ACKNOWLEDGMENTS

I would like to thank Whitehead Elementary faculty for their time and help with the survey and also answering all of my questions. Michelle Johnson for introducing me to the garden and the wonderful students that volunteer to help make the garden beautiful and productive. Kendra Murdock for allowing me time in her class for the past quarter and teaching me on the everyday life in primary education. Michael Rios, Cory Parker, and Sheryl Ann Simpson for having the patience to guide me through this difficult task. My mother for being an awesome mom and giving me the extra confidence to complete this research.

Thank you.