THE AGE OF DEVELOPMENT:

UNDERSTANDING THE ARCHITECTURAL IMPACT OF A KINDERGARTEN CLASSROOM ON THE DEVELOPING MIND OF A CHILD

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Understanding the architectural impact of a kindergarten classroom on the developing mind of a child

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ARCH 5100-5200 | 5110-5210 Master Thesis Studio and Master Thesis Supplement
Fall 2021–Winter 2022
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ACKNOWLEDGEMENTS

I would like to thank a number of people who have played a significant role in my thesis and graduate year. They have stood by my side and have cheered me on every step and for that I am beyond grateful.

To my incredible thesis advisor, Claudia Bernasconi who has guided me every step of the way and pushed me to go above and beyond.

To my parents, thank you for the sacrifices you have made throughout my life. I would not be here and completing my degree if it was not for your dedication, love, and hard work.

Lastly, to my friends, whom I shared endless moments of laughter and tears. Im very thankful to have such an amazing group by my side.

ABSTRACT

The purpose of this thesis is to generate a kindergarten classroom design that is not governed by the needs of a multipurpose classroom but instead, curating an integrated learning experience. This permits the learners to be able to control their own learning through more flexible, self-controlled and autonomous exploration. The educational landscape is constantly shifting with remarkable advancements in technology and changing pedagogy. In the upgrading of Ontario's public school system, the traditional kindergarten classroom remains largely unchanged. However, we assume that the addition of facilities that schools are currently integrating are ineffective since the root problem lies within the poorly designed classrooms, with the impression that all forms of learning can effectively be done within the same four walls. More recently, it is expected for learners to be future-proof by providing the opportunity of unique experiences in the learning environment to children through design elements focusing on sustainability, play-based learning, sensorial design, open-layout, and scale. These elements will bring opportunities that will remain relevant to them in their future when it comes to developing a love for life-long learning through refining the child-like curiosity in the classroom.

CONTENTS

THESIS STATEMENT

The general focus of this study is to improve the current learning environments of kindergarten classrooms by taking inspiration from global classroom design and learning methods throughout history. The way each individual learns is different, therefore the classroom needs to be able to accommodate all learners. Classroom environments and learning methods have not seen a notable change since the time of the Industrial Revolution. Through this study, it has been shown that the essence of the design of the classroom remains the same; which is expected to be a closed classroom, with conventional furniture, and the teacher determining the learning activities. With the changing times, as new studies on various styles of learning and brain functions emerge, there is a need to customize education and cater to every individual's need as everyone learns differently.

The first framing concept of this thesis is the learning/teaching methods because the way the teacher teaches, interacts, and communicates with the student influences the way they learn and absorb information. A survey was conducted between public school and Montessori school teachers to show how these teachers implement distinctive styles in their teaching and classroom design/layout. The second framing concept is the spatial quality in a classroom. Spatial quality in general is an important concept when designing any space, in the case of a classroom it needs to provide a level of stimulation where students can learn from different environments, whether it's natural or artificial, allowing them to experience the classroom comfortably. The last framing concept is the built environment. These concepts are studied through surveys, precedents, and classroom analysis. The way a class is designed and laid out can have an impact on how well students learn. Classroom layout is not just a matter of rearranging chairs, but of purposefully rearranging a classroom into a multiplicity of learning environments to achieve desired outcomes. How the classroom is arranged should depend on personal philosophy, therefore it would show through the outcome from the students.

This study focuses directly on the relationship between the student and the classroom. This includes the growth in technology and the unique way everyone learns. One question that was focused on is how can meeting children's needs for a modern world support early childhood development by improving classroom conditions? In addition to further learn and develop design principles for further classroom design through the question, how can we implement learning theories and environments in current and future classrooms?

Today's classrooms are not designed to assist students' learning. They need to be designed in a way where they create different environments and allow for design changes in the future. This is important because it benefits students and allows them to experience an environment that helps them learn better. According to a study, a school's physical design can improve or worsen children's academic performance by as much as 25 percent in early years. The

physical environment of the school and the classroom play a crucial role in affecting the learning of the children and their overall development. The physical environment can be changed using design principles of experiential learning.

One of the biggest concerns would be that it is not possible to change all current schools and these strategies would be recommended to be used in the design of future schools. Instead, I argue that parts of these strategies can be implemented in current-day classrooms to improve the students' learning through minimal changes and additions. Another critique would be the budget and the cost of these changes, as well as the safety concern and how code would still be implemented.

One of the biggest limitations to my study that has come across in my research is design code. Code will be restricting the layout and design of classrooms due to safety concerns. Another limitation is the COVID-19 pandemic; it has restricted me from observing and investigating the classroom. This also includes the way students interact with one another when it comes to learning theories and the way each student is around another. Social distancing has made it difficult to understand the current movement in a classroom.

This study focuses on enhancing the development of a student in the environment they are learning in, with growing technologies, through different methods of learning and a change in an environment where they learn by experience. Architecture and design play a significant role in a pupil's learning because the classroom environment needs to be designed creatively and be flexible to be changed to create a modernized learning environment.

KEY TERMS

education, environment, learning, student, policy, teacher, classroom, kindergarten, design, pedagogy, playing, learning theory, indoor, outdoor space, spatial quality, built environment

1

Introduction

1.1 | WHAT IS THE ISSUE?

Education is an essential part of every child's life and the experiences and lessons that are learned often carry them through life. The lessons they learn as children are intended to prepare them for the real world, one outside of the sheltered walls of the classroom. However, with the shifting advancements and developments in technology and the global economy, a working adult possibly feels that the skills and knowledge they were taught in school were not adequate for the real world. The question is, who is to blame for how teachers taught and prepared students for a world that they did not know yet and jobs they cannot comprehend?

Pedagogy today is directed more towards equipping students with more interpersonal skills and critical thinking skills. With there being many forms of media and technology, information is easily accessible through the World Wide Web for anyone. This means that students will no longer need to fully comprehend the "what" when learning, simply just the "why" and "how". Nowadays, children around the age of four learn faster through accessible technology, such as their parents' phones and iPads. This is why there are many interesting and new methods for delivery of lessons that encourage effective learning and participation in a classroom. Without regard to the need for a shift from content delivery to skill development, many schools, teachers and even governments are overwhelmed and limited to the transition of a new teaching method. The existing infrastructure is fixed in the ideas of the industrial revolution. New and advanced infrastructure can only be added onto the existing architecture, which provides new facilities for the school but does not truly impact the way a child learns. The need is for the classroom to facilitate ideals of the new educational paradigms of the 21st century for young developing children to learn in the most effective environment. Today's system and infrastructure are very outdated and seem to provide pupils with the mindset of past generations with better technological skills.

While education is compulsory nationally, the intent to better the learning environment for the developing mind is to ensure students are being prepared to have a passion to learn. In order to effectively integrate efficient classroom design into today's curriculum, architectural interventions are required to push the gradually evolving system above and beyond.

Figure 1: Children in a classroom
Source: Coordikids

The purpose of any education system is to help students learn. The key to student learning is effective interaction between a student and a teacher. A school is the place that is best equipped to facilitate that interaction. This raises the question: how can we better design schools for maximum effectiveness for learners?

The general look and nature of a classroom has not changed since the early 20th century and this may be an issue for the current generations. According to The New York Times article, a study has shown that the colorful artwork on the walls of a kindergarten classroom are distracting them from learning. The research states that "kindergartners were taught in a highly decorated classroom, they were more distracted, their gazes more likely to wander off task, and their test scores lower than when they were taught in a room that was comparatively spartan." (Hoffman, 2014)

1.2 | WHAT IS THE IMPACT OF CLASSROOM DESIGN ON PUPILS' LEARNING?

With the classroom being such an important space, it is important to understand how the environment affects the users. Stewart, Evans and Kaczynski (1997) argue that "an orderly and attractive environment can have a positive effect on behavior by improving the level and quality of student interactions, so teachers and students carry out activities efficiently without excessive noise or interruption". While Landau notes that "visual learners, for example, do better at any level if the classroom has interesting and appealing items on display" (Landau, 2004).

This means that teachers can rearrange and design their classrooms so they are visually appealing by having bright, colorful displays or bulletin boards throughout their classrooms. This could also include movable furniture for students to arrange furniture in clusters which creates an environment in which students feel more comfortable to work cooperatively with their peers.

Figure 2: Instructor assisting student.
Source: Aarohi Achwal

1.3 | HEAVILY DECORATED CLASSROOMS DISRUPT ATTENTION AND LEARNING

Anna V. Fisher, Karrie E. Godwin and Howard Seltman are psychology researchers at Carnegie Mellon University. They looked at whether classroom displays affected children's ability to maintain focus during instruction and to learn the lesson content. They found that children in highly decorated classrooms were more distracted, spent more time off-task and demonstrated smaller learning gains than when the decorations were removed.

"Young children spend a lot of time — usually the whole day — in the same classroom, and we have shown that a classroom's visual environment can affect how much children learn. Therefore, I would suggest that instead of removing all decorations, teachers should consider whether some of their visual displays may be distracting to young children." (Fisher, 2014)

For the conducted study, 24 kindergarten students were placed in two different classrooms. The students were given a total of six science lessons. Three lessons were taught in a heavily decorated classroom (Figure 7) that included a variety of colorful maps, number lines, shapes, artwork and other materials that teachers use to cover kindergarten classroom walls. While three lessons were given in a sparse classroom where all the decoration was removed (Figure 6). After the lessons, Fisher, Godwin and Seltman tested the children's knowledge.

The results showed that while children learned in both classroom types, they were able to learn more content when the room was not heavily decorated. Specifically, children's accuracy on the test questions was higher in the sparse classroom than in the decorated classroom. (Figure 3)

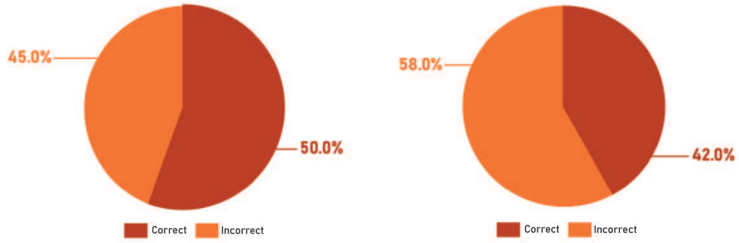


Figure 3:Children's test results.

However, when the researchers tallied all of the time children spent off-task in both types of classrooms, the rate of off-task behavior was higher in the decorated classroom than in the sparse classroom. (Figure 4)

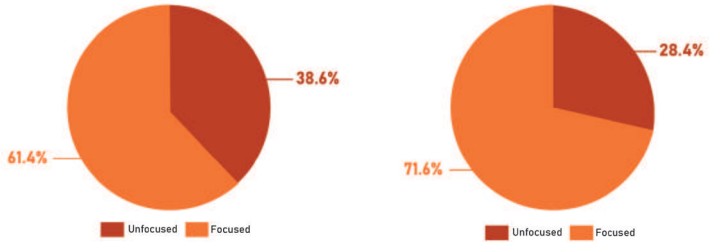


Figure 4: Children's focus level results.

Figure 5: Typical heavily decorated classroom.
Source: APS

Figure 6: Sparse classroom
Source: APS

Figure 7: Heavily decorated classroom
Source: APS

2

Learning Theories & Methods

2.1 | PROGRESSION OF LEARNING THEORIES

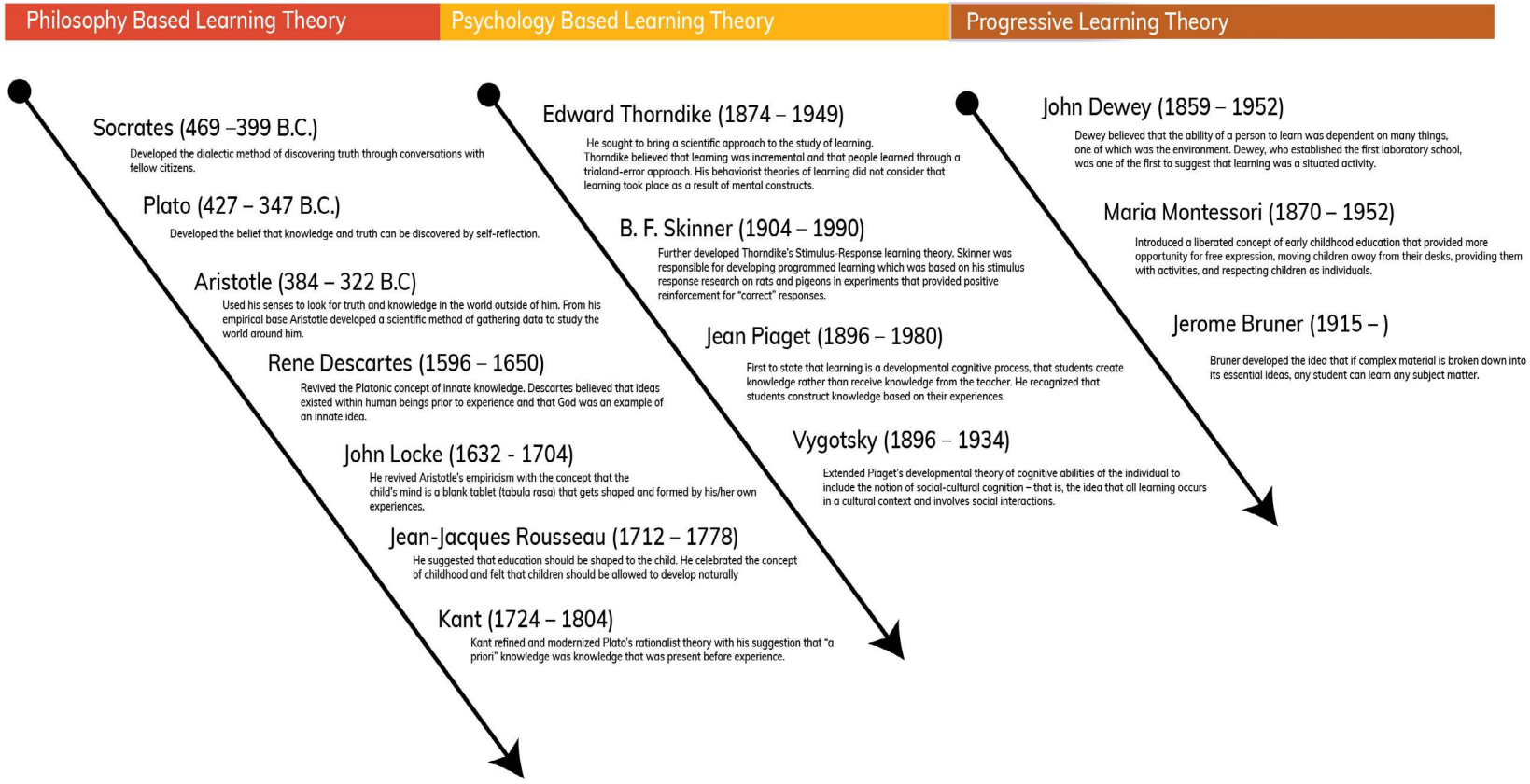


Figure 8: Timeline of the progression of learning theories.

2.2 | 8 LEARNING THEORIES THAT SHOULD BE IMPLEMENTED IN THE CLASSROOM

Everyone is different and their learning style is as well. No two brains are alike, they are all unique in diverse ways, and our experiences contribute to the different ways that we learn. Psychologists and theorists have spent so much time researching and experimenting to better understand how people learn at different stages of their lives. This section will focus on eight key pedagogical learning theories that educators can use in the kindergarten classroom to help them improve learning environments to enhance their learning. All teachers should be trained to be ready to teach students every day, and an important part of teacher training is understanding and being able to apply the different ways of learning while teaching. There are many learning theories that teachers can use to prepare to support students in the classroom. Teachers who understand learning theory can use different techniques in their classrooms to address different forms of learning. This can help all students succeed academically.

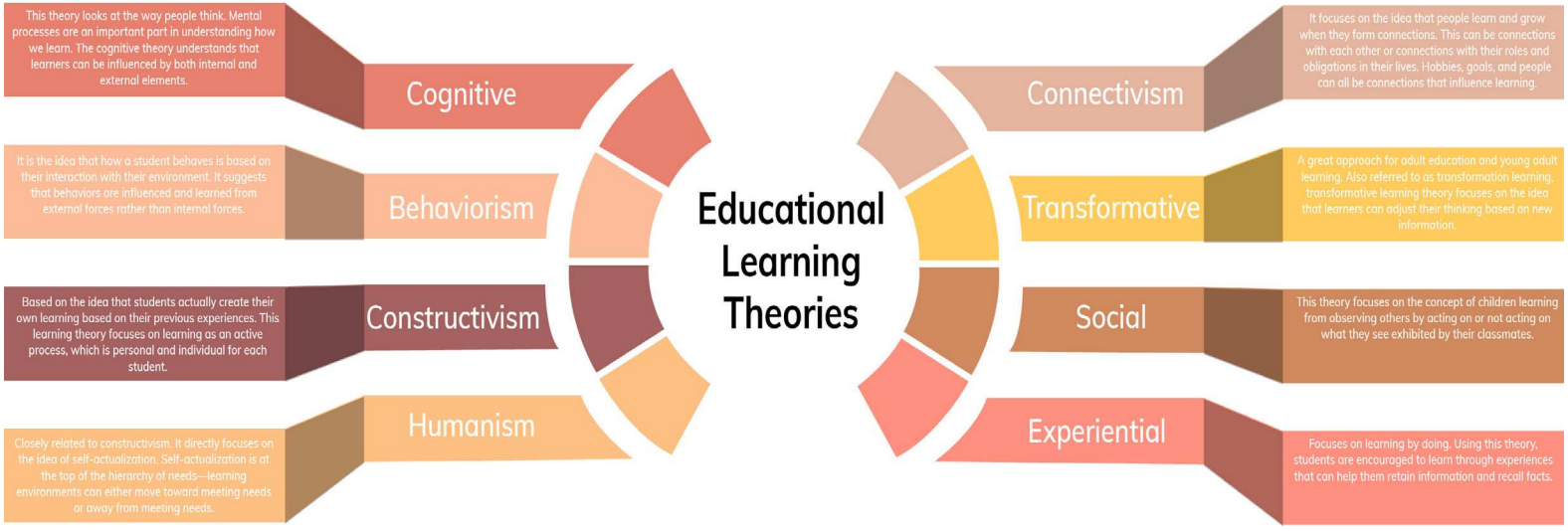


Figure 9: 8 educational learning theories.

2.2.1 | COGNITIVE LEARNING THEORY

Cognitive learning theory is about people's way of thinking. Learners assume that they can be affected by both internal and external elements. Plato and Descartes were two of the first philosophers to study human knowledge and thinking. Many other researchers dug deeper into the way we think and encouraged further research. Jean Piaget is a very important figure in the field of cognitive psychology, and his work focuses on the environment and internal structure, and how they affect learning.

Cognitive theory evolves over time and breaks down into sub-theories that focus on the unique elements of learning and understanding. At the most basic level, cognitive theory suggests that both internal thinking and external forces are important parts of the cognitive process. And when students understand how their thoughts affect learning and behavior, they gain more control over their thoughts.

Cognitive learning theory affects students because it helps them learn by understanding the thinking process. For example, teachers can give students the opportunity to ask questions, and can fail and think loudly. These strategies help students understand how their thinking processes work and use this knowledge to create better learning opportunities.

2.2.2 | BEHAVIORISM LEARNING THEORY

When a learner behaves in response to their actions in the environment, this is known as behaviorism learning theory. It demonstrates that external influences are more likely to promote and discover behaviours than internal forces.

Behaviorism has been rising in popularity among psychologists since the nineteenth century. This learning theory can be found and quantified, and it is the foundation for psychology. Pavlov's dog studies demonstrate that behaviours are immediately reinforced by the outcome, making positive reinforcement a well-known aspect of behaviourism. As a result of the behaviourism idea, students who receive positive reinforcement are more likely to continue going forward.

2.2.3 | CONSTRUCTIVISM LEARNING THEORY

Constructivism is a learning philosophy that assumes pupils construct their own learning based on prior experience. Students use what they've learned with their past knowledge and experience to create a reality based on their observations. This learning approach emphasized each student's learning as a distinct and unique process.

Constructivism can help teachers recognise that each student brings their own history to class. Constructivist teachers act as guides for pupils, assisting them in deepening their knowledge and understanding. They assist people in developing their own processes and realities based on their own experiences.

2.2.4 | HUMANISM LEARNING THEORY

Humanism learning theory is linked to constructivism since it focuses on the concept of self-actualization. The

ultimate level of conjecture in the hierarchy of wishes is self-actualization. It's the point at which all of his wishes come true, and you realise he's at his most effective. Everyone appears to be striving toward it, and the learning environment can either satisfy or ignore your requirements.

Teachers may establish classroom environments that encourage students to reach their full potential. Educators help students meet their emotional and physical needs by offering a safe and comfortable space to check in, as well as the support they need to achieve.

2.2.5 | CONNECTIVISM LEARNING THEORY

One of the most recent pedagogical learning ideas is connectivism. It is based on the premise that people learn and grow when they form relationships. These ties might be made with one another or with their job and responsibilities in their lives. While interests, objectives, and people can all be sources of learning influence.

Teachers can use classroom connections to interact with students and understand what they appreciate. Teachers can use digital media to create positive learning connections for their students. It can assist pupils form bonds and relationships with their friends while also encouraging them to study.

2.2.6 | TRANSFORMATIVE LEARNING THEORY

Transformative learning theory is a fantastic approach to adult and adolescent education. Learners can modify their thinking based on new information, according to transformative learning theory. This learning idea was created by Jack Mezirow, who discovered it while researching adult graduates. Adults in his initial study did not apply their previous understanding to the new scenario, and instead assisted in gaining a new viewpoint. Mezirow also believed that the student's prior experience provided valuable educational and learning possibilities, and that critical analyses and reviews may lead to a shift in their perception. Because children do not face the same changes in their learning and life experiences as adults, this strategy is appropriate for them. Adult students can use their childhood experiences to influence their ideas and attitudes, as well as help them via critical reflection to comprehend what they think and understand as adults.

In general, the theory holds that the more we study to better understand new concepts and ideas, the more our worldview will shift. Students can make significant educational changes beyond ordinary learning by getting new knowledge to evaluate old concepts. Teachers can use this learning paradigm to enable students to gain new viewpoints, examine their beliefs, and engage in open discussions to consolidate their new ideas.

2.2.7 | SOCIAL LEARNING THEORY

When dealing with difficult children who prefer to muddle teachings and cause problems, social learning theory can be a useful tool. This hypothesis is based on the idea that children learn by watching others and reacting to what they see as classmates. For example, you might

witness a student politely requesting and receiving a treat, or you might overhear another classmate discussing something new they have learned.

Albert Bandura is the creator of this learning theory. In the early 1960s, he conducted an experiment known as the Bobo Doll Experiment. In this study, we looked at how youngsters reacted after observing adults react positively to toys like dolls. After hitting the doll, he observed how children would react if an adult was rewarded, reprimanded, or had no consequences. In 1977, Bandura published a paper in which he explained the notion of social learning and how it influenced student behavior.

The four aspects that make up the social learning hypothesis are as follows. To help the children focus, different or unique teachings or activities are required. Retention is concerned with how students assimilate and later memorise knowledge. Reproduced and previously learnt behaviors, as well as when to use them, are discussed. Other students' motivation can come in the form of being rewarded or reprimanded for their activities.

Teachers can effectively assist pupils to learn more actively, pay more attention, and devote their energy to the lesson by adopting social modelling based on these aspects.

2.2.8 | EXPERIENTIAL LEARNING THEORY

Hands-on learning is the focus of experiential learning theories (ELT). This idea promotes pupils to learn through hands-on activities that help them remember facts and knowledge. David Kolb identified this theory for the first time in 1984. Other theorists such as John Dewey, Kurt Lewin, and Jean Piaget influenced Kolb, but he was able to define four stages of ELT. Concrete learning and retrospective observation, the first two processes, are concerned with capturing experience. Abstract conceptualization and vigorous experimentation, the latter two, are concerned with the alteration of the experience. Effective learning, according to Kolb, means that the learner has gone through a cycle of empirical learning theory.

Reading about animals, as well as viewing films and visiting the zoo, are examples of this type of learning. By establishing an environment where students may learn and experience at the same time, teachers help students to swiftly apply knowledge and obtain hands-on experience. This method has been shown to increase teamwork and motivation.

2.3 | INTERACTIVE LEARNING

Interactive learning is a method of reaching out to a variety of pupils in the classroom who might struggle with standard academic studies. “Interactive learning aggressively involves the students in wrestling with the information,” according to Stanford University School of Medicine. It invigorates both students and faculty in the classroom.

Interactive learning sharpens critical thinking skills, which are essential for the development of analytic reasoning. It also engages kids who have been nurtured in a hyper-stimulated environment. Instead of simply regurgitating remembered information, a youngster who can examine an open-ended question with imagination and logic is learning how to make decisions.(Scholastic, 2021) In addition, interactive learning teaches youngsters how to communicate and work well in groups, which is an increasingly important ability as workplaces become more team-oriented. Figure 10 & 11.

Interactive learning can come in a variety of shapes and sizes. Students use a more comprehensive approach to learning to improve their critical thinking and problem-solving skills. With or without technology, interactive learning can take place across the curriculum.

Figure 10: Floor Projection
Source: Mark Whatmore

Figure 11: Digital Desk
Source: Acronym

2.4 | PLAY-BASED LEARNING

Play may test children's thinking when they engage in real-life and imaginative activities. Firsthand experiences are the most effective way for children to learn. Children's development of abilities, concepts, language acquisition, communication skills, and concentration is aided by play, which encourages, stimulates, and supports them. Children must express their thoughts and emotions, investigate their environment, and combine what they currently know with new knowledge, abilities, and attitudes when playing.

Children put new theories and information to the test in the context of play. They rehearse events to help them remember them. It is here that youngsters learn and articulate symbolic thought, which is a prerequisite for literacy. The earliest form of storytelling is play. It's also how kids learn to communicate with their classmates, solve problems, and improvise.

Basic social skills like sharing and taking turns are learnt and practised via play. In addition, children bring their own language, habits, and culture to the game. They also learn about their peers as a result of the procedure.

Finally, play encourages students to have a positive attitude toward learning. Imagination, curiosity, enthusiasm, and perseverance are only a few of them. Traditional rote learning, which focuses on memorising facts, cannot match the types of learning processes and skills fostered in play.

Figure 12: Children socializing
Source: Baker Demonstration School

Figure13: Play-Based Learning Collage

3

Learning Environments

3.1 | 4 LEARNING ENVIRONMENTS

During the 1990's David Thornburg, Ph. D. presented an idea about four learning environments that are important for all learners (Thornburg, 2007).

Campfire: Throughout history, storytelling has been used as a way of teaching, a way of passing on the wisdom of the elderly to the next generation. The campfire is a typical place for storytelling where people gather and absorb information. In schools, the campfire symbolizes spaces where people can gather and learn from experts.

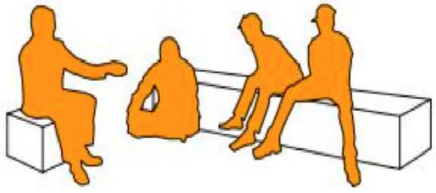
Watering hole: In history, people shared and discussed information with their neighbors by the watering hole. It was an informal learning place where they could share the latest news. The watering hole symbolizes spaces where we interact and learn from our peers.

Cave: Occasionally, people have felt the need to be alone to get in contact with themselves and gain personal insights. The cave was one of the spaces where people went to process information into knowledge.

Life: We establish insights through campfires, watering holes and caves, but to really learn something, we have to try it in real life.

Thornburg describes four learning settings that must be harmonised. Traditionally, kids have only had access to the campfire in the classroom and the watering hole at the playground, with few opportunities for reflection and real-life applications. The unbalanced split makes it difficult for students to translate what they learned around the campfire into useful skills.

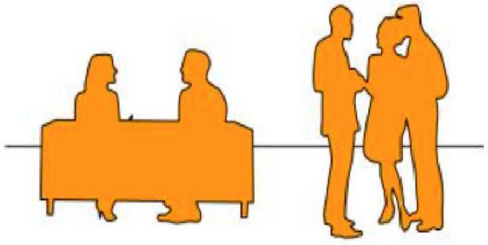
There is no use in having an education that relies solely on storytelling since that teachers and textbooks are no longer the main sources of information. The digital revolution has opened up a whole new realm of narrative that can be accessed at any time. Instead of spending time on giving material, teachers can now concentrate on the students' understanding. The organization with one classroom for each class no longer makes sense when narrative goes from being the main portion of the instruction to being a supporting aspect. Students must learn in a variety of situations while alternating between different locations.



CAMPFIRE - LEARNING FROM EXPERTS

listening watching

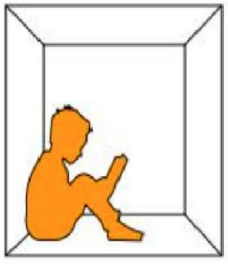
Space for storytelling



WATERING HOLE - LEARNING FROM PEERS

talking

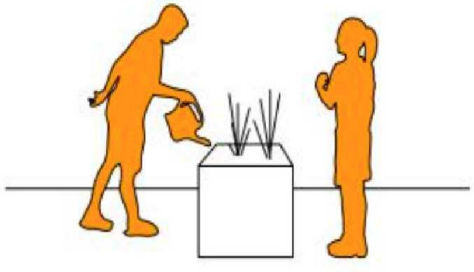
Space for interaction



CAVE - LEARNING BY YOURSELF

reading writing

Space for reflection



LIFE - LEARNING BY DOING

creating

Space for testing

Figure 14 : Four types of Learning Environments
Referenced: Johanna Boström

4

Understanding the Integration of Learning Theories Across the World

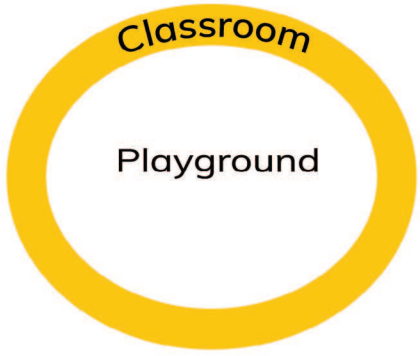
Figure 15: Fuji Kindergarten
Source: Tezuka Architects

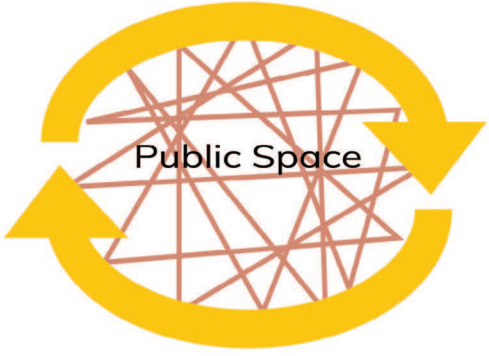
4.1 | FUJI KINDERGARTEN

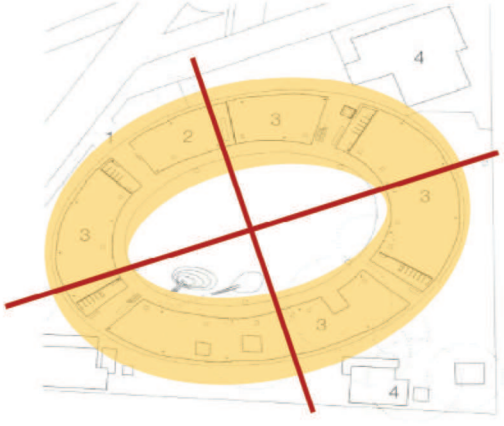
Fuji Kindergarten is a Japanese kindergarten located in Tokyo. The goal of this design is to react to human life and activities. This endeavour, on the other hand, goes beyond that and genuinely influences human existence and behavior. One of them is Fuji Kindergarten. It is no exaggeration to claim that it shapes the learner's personality and individuality for instructional reasons. Tezuka Architects have designed a shell that incorporates cutting-edge learning concepts, culture, play, joy, and nature contact.

The concept is straightforward. Children are not forced to spend their time indoors or outdoors. They have complete freedom of movement, including on the roof. They are free to explore, play, and move throughout the facilities in whatever direction they like. This sense of independence is an important aspect of the academic process. The structure connects the indoor and outdoor spaces to allow for this adaptation and to reflect the mindset of a kindergarten school. Here are a few things Tezuka Architects said about their design:

> *"The kids love to look through the skylights from the roof. 'Where's my friend?' 'What's going on underneath in class?' And when you look down, you always see kids looking up from below. Here, distraction is supposed to happen. There are no walls between classrooms, so noise floats freely from one class to the other, and from outside to inside. We consider noise very important. When you put children in a quiet box, some of them get really nervous." (Tezuka Architects, 2015)*







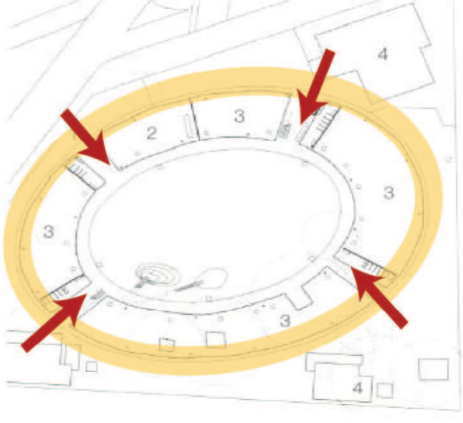


Figure 16: Circulation Diagrams

Figure 17: Fuji Kindergarten
Source: Tezuka Architects

1 ZELCOVA TREE
The Zelkova trees are the perfect playground for children. sometimes, there are more than forty kids climbing the tree at the same time.

2 CEILING HEIGHT
The ceiling height on the courtyard side is 2100 mm. an adult is able to reach up and touch the dangling feet above. the top and bottom of the roof have a close relationship.

3 NET HOLES
Holes have been cut out of the roof for trees to project through and a net has been strung around each tree so the kids can plunge into the net (the net has a 60mm grid of squares so a child's head cannot get stuck) and clumb up on trees.

4 HANDRAIL
Encircling the roof is a slender baluster with a maximum spacing of 110mm, too small for a hcild's head to enter. Children's feet can pass through the gaps. therefore children use that space to sit with their feet dangling and facing the courtyard.

5 CHILDCARE ROOM WASHBASINS
Rather than washing ones hands while facing a wall, it was believed that it is more fun for everyone to gather together like an event, cheering and shouting. the water faucet is flexible, allowing it to freely bend the hose.

6 FURNITURE BLOCKS
The basic idea for firniture is a simple building block. it's made from a soft, lightweight wood called Paulownia. The blocks can be carried by the children, and have rounded corners allowing them to be safe when children bump into one another.

7 SKYLIGHTS
For every room there is a skylight for the space below. You could place a ladder and climb directly onto the roof. It allows students to see one another and find it interesting when they are peaking into the room through a different perspective.

8 SLIDE
The play equipment was just one slide. To reach the slide, children must climb a mound of soil about 1 meter high, then ascend a staircase onto a roof.

9 HALLWAY
The eastern part of the oval is wider than the other sections, and is divided into 5 learning spaces. if the furniture is moved aside, the space becomes a hall that can accomodate about 600 people.

10 TREE ROOTS & FOUNDATION
A Zelkova trees roots extend as far as the spread of its branches, in this case all the way from the inner courtyard tot he edges of of the building circumference. The roots were located and a grid of steel beams were created and extended foundations for the trees.

11 OPENABLE BUILDING
For 2/3 of the year, the kindergarten is completely open. This is for children to freely see explore and not be trapped within boundaries.

12 EAVES & GARGOYLES
There are five gargoyles at the eaves of the courtyard. the collected rainwater falls from 5 places into 5 large basins in the courtyard. on rainy days, children gather around the waterfalls that flow from these gargoyles.

13 BACKGROUND NOISE
The key was to design a space as open as an environment, filled with background noise. not only is noise coming from other classrooms, but from the outside too. The children are selecting information from from the background noise.

14 NATURAL ENVIRONMENT
Children need to be treated as a part of the natural environment. Dr. Tsutomu Ohashi said, we are a kind grown up in the jungle; we cannot deny what we are. When we overprotect children with artificially created environments, they cannot grow up properly.

Figure 18: Fuji Kindergarten
Source: Tezuka Architects

Figure 19: Fuji Kindergarten
Source: Tezuka Architects

Figure 20: Fuji Kindergarten
Source: Tezuka Architects

Figure 21: Timayui Kindergarten
Photography: Jorge Gamboa

4.2 | TIMAYUI KINDERGARTEN

Timayui Kindergarten is located in Santa Marta, Colombia. "It's based on the special understanding of Malaguzzi Loris pedagogical philosophy, and was born the idea of creating an element that suggests 3 interrelated centralities, and which cause a range of situations and experiences among children, teachers and family." (architecturelab, 2011)

Timayui Kindergarten's design produces behavioural and learning circumstances, and the classroom itself is viewed as a learning mechanism. The youngsters are taught how to work with a variety of materials, including soft and hard, open and closed, hot and cold, and a variety of different situations. The purpose of this design is to assess every aspect of the school as a learning environment. As a result, learning takes place not just in the classroom, but also in the building's common areas and the courtyard. The outdoor space is a place for creativity, games, and dreams, not simply for playtime. It can also be used for customised activities and special events.

The spatial arrangement begins with an awareness of Loris Malaguzzi's educational philosophy, which led to the creation of an element that implies three related centralities and causes a variety of scenarios and experiences among children, teachers, and families. (Figure 22)

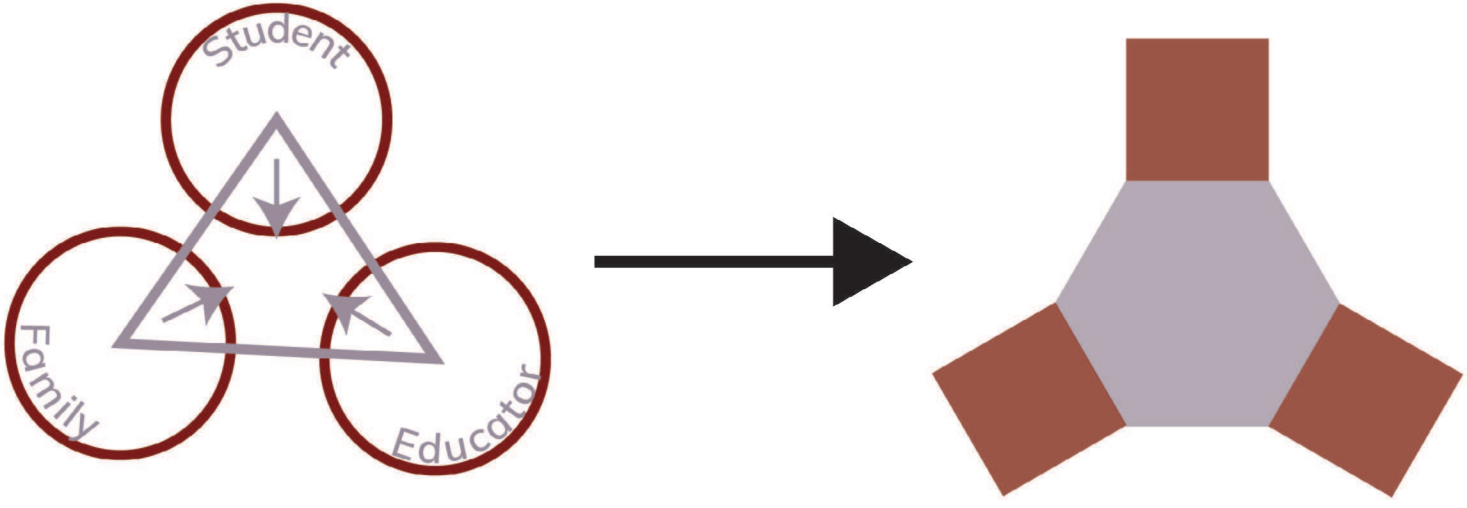


Figure 22: ‘flower shape’ design concept

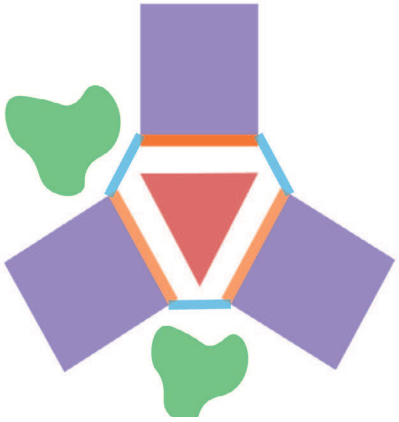


Figure 23: Massing

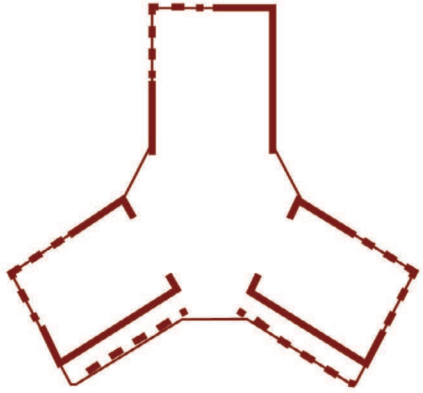


Figure 24: Window location for natural light and ventilation.

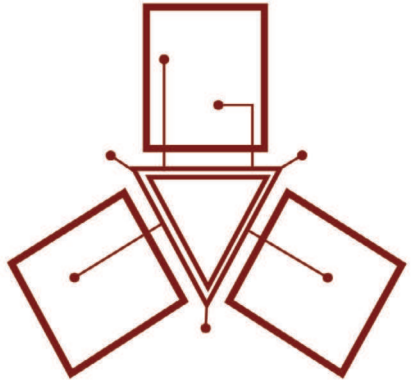


Figure 25: Circulation

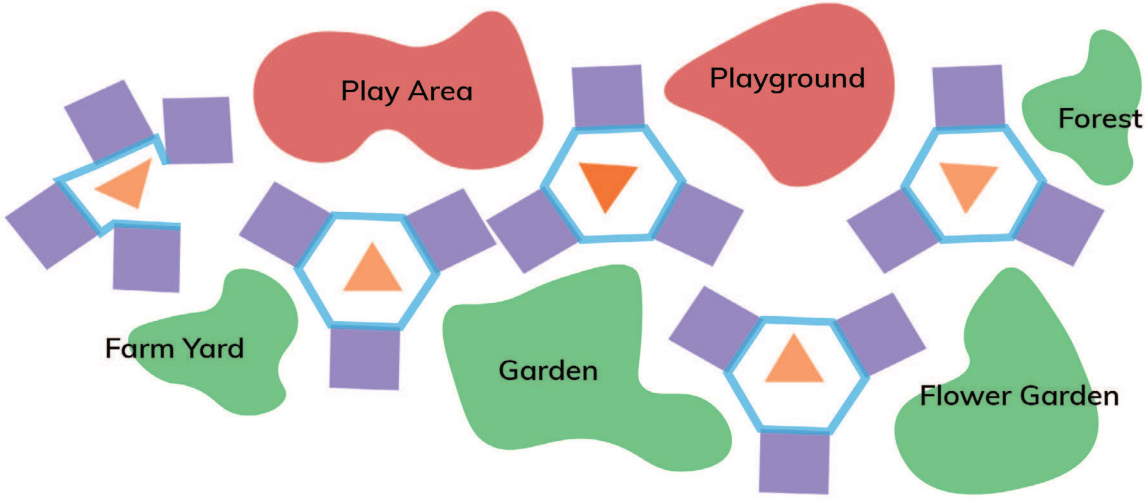


Figure 26: Diagrammed Plan

Figure 27: Classroom Analysis

Figure 28: Classroom A
Source: El Equipo Mazzanti

Figure 29: Classroom B
Source: El Equipo Mazzanti

Figure 30: Classroom C
Source: El Equipo Mazzanti

Figure 31: Kindergarten Lotte
Photography: Kaido Haagen

4.3 | KINDERGARTEN LOTTE

Kavakava Architects designed Kindergarten Lotte. Kindergarten Lotte is a high-quality project with strong contemporary architectural influences. The relevance and elegance of basic geometry are exemplified in this project. It not only created a fun architectural area for kids to explore, but it also contained knowledge that they could use in the future.

The layout of the kindergarten, a six-cornered, star-shaped floor plan crammed into a square, resulted from a desire to minimise long corridors and create an organised exterior boundary and street space for the structure. The building is on one edge of the plot, leaving the southern side open for play. Kindergarten home rooms, creativity classrooms, kitchen, dining area, and administrative offices are all located within the six petals. The star-shaped interior lets in a lot of light.

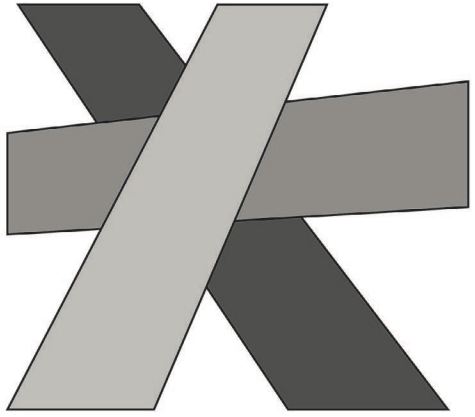


Figure 32: Massing Diagram

Figure 33: Diagrammed Plan

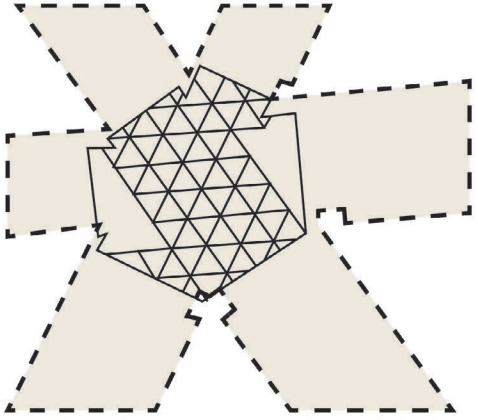


Figure 34: Structure Diagram

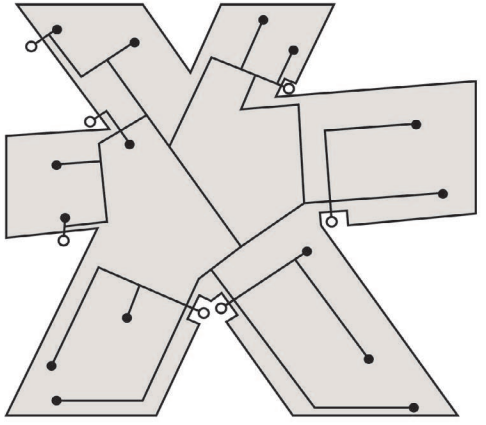


Figure 35: Circulation Diagram

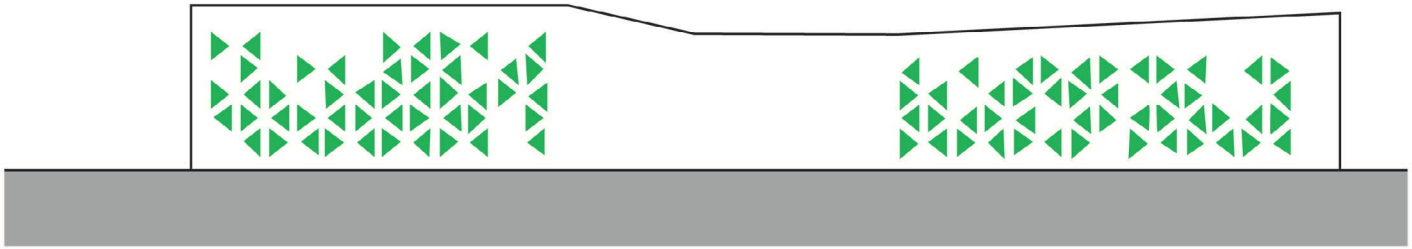


Figure 36: Elevation focusing on the windows.

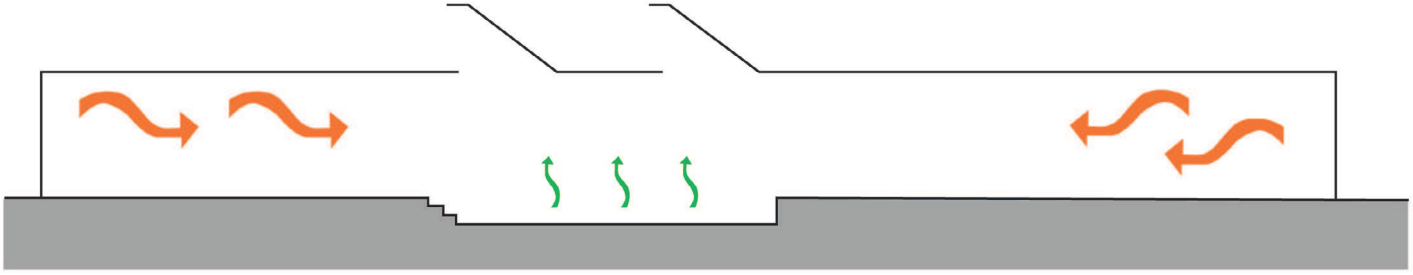


Figure 37: Section diagram focusing on air circulation.

Figure 38: Render of students making use of gathering space.
Source: Kaido Haagen

4.4 | DISCUSSION

The case studies looked at a variety of approaches to designing a children's educational facility. They appear to be very different at first glance, but when compared, they all have certain similarities.

The application of basic geometry is the first and most noticeable characteristic. The building forms in all of the situations were rather simple geometries. Geometric motifs and basic ornamentation were also used in the interior design of all four studies. This application appeared to have a good impact on the formation and intellect development of young children.

Second, they all underlined the value of natural light, citing window apertures and curtain walls as crucial design components. Consider the operation hours of a normal kindergarten; this form of schooling necessitates the use of daylight. Designers in each study tended to use window apertures as a playful design for youngsters to explore as well as a means to get natural light.

Third, all of these studies focused on the use of shared space, such as corridors, courtyards, and playgrounds. Each study created different divisions to divide the functions associated with the space, but they also emphasised the common areas that were enjoyed by all members of the building.

Fourth, the portions for indoor and outdoor playgrounds differ the most between these case studies. Natural materials and plants were used in each study to bring nature and outside environment indoors. While maintaining a connection to nature, whether through huge windows, easy access to outside play areas, classroom transitions, and outdoor classrooms.

5

Understanding North American Classroom Conditions

5.1 | HISTORY OF ONTARIO SCHOOLS AND POLICY

Education evolves mostly in response to shifts in political power and economic priorities. Education and theoretical learning have always been a privilege reserved for privileged people such as politicians, clergy, and the upper classes. Working-class and lower-class people would most likely learn the skills of the trade in which they were born, which is now referred to as vocational training. The growth of public schools and compulsory education in the 1800s and 1900s ushered in the knowledge economy. There, the workforce has progressed from manual labour to management, manufacturing, and, most recently, design.

As seen in the timeline (Figure 39), views regarding education shift, school design evolves, different curriculum areas emerge, and teacher-student relationships grow. Today's schools provide a more diverse environment that allows students to go out of the classroom while still completing a formal curriculum.

1798
First Ontario school in Toronto (1 ROOM)

1807
The Public Schools Act

1816
The Common Schools Act

1823
A general board of education was created. (3-5 CLASSROOMS)

1841
The Union Act (Education Act) stated that Ontario would have a chief superintendent of education.

1844
Egerton Ryerson (superintendent of education) promoted education for all. (DIFFERENT LEVELS/GRADES)

1846
New Education Act was passed. (FORWARD SEATING)

1850
The Act was amended, giving permission to any school section to determine how the school should be maintained.






1867

Most non-aboriginal residents were practicing Christians (Protestants and Catholics). Most schools provided religious instruction. (MULTIPLE INSTRUCTORS)

1876

The School Act was amended to establish an Education Department. Education was mainly funded by local tax payers. (GROUP SEATING)

1940

Ontario Education Association to pay 50% of educational costs. (GATHERINGS)

1960s

Over 3,000 school boards in Ontario were reduced to about 170.

1997

Local support to education was greater than from the province.

1998

Ontario's education funding model was a guaranteed tax-base grant. (FREE PUBLIC EDUCATION)

Figure 39: Ontario School and Policy Timeline

5.2 | TYPOLOGY OF ELEMENTARY SCHOOLS IN ONTARIO

Pre-War Era (1900-1939)

Neoclassical facades with standardized and utilitarian classrooms featuring rows of desks

Spacious classrooms with high ceilings

Emphasis on daylighting, natural ventilation and the importance of outside views for student's health

Post-War Era (1945-1960)

Standardized classroom design with an emphasis on cost consciousness

Low/no ventilation standards

Artificial incandescent lighting used throughout schools

Postmodernism (1960-2000)

Emphasis on prefabconstruction methodology

Windows replaced with mechanical ventilation systems and fluorescent light

Lack of sound absorption and natural lighting

21st Century (2001-Present)

Emphasis on environmentally friendly learning spaces

Natural lighting and ventilation

Focus on the health and wellbeing of students

5.3 | TEACHERS' INTERPRETATION OF THEIR CLASSROOM DESIGN & TEACHING STYLE

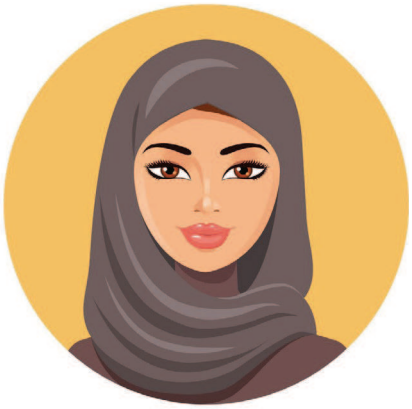
In this study, 5 yeachers, two Montessori teachers and three public school teachers, were asked one simple question.

"How would you describe your teaching style?"

Many of the answers are similar but they are all very opiniated based on the teacher, how long they have been teaching and what has and hasnt worked for them.

Montessori School Teacher A

"I've been teaching for over 30 years and have learned a lot about how the young mind works. I can express that my teaching style is very adaptable. I believe teaching methods or some other way to interact with the students in the classroom is sufficient. In my opinion, every class is different and every lesson is different. A good teacher should always adapt his/her teaching to the audience, the level of discipline in the class, the difficulty of the lessons, and so on. I simply prefer to teach by being a demonstrator, facilitator, and delegator. It has worked so well so far, so there is no reason to doubt the effectiveness of my teaching method."



Montessori School Teacher B

"I would describe my teaching as coaching because many students cannot handle critical feedback. Instead of providing direct answers to my students, I push them to think harder to get the answer on their own. I try to ask the right questions, and with the help of my performance and group activities, they will find the answers themselves. Personally, I feel the younger generation lacks critical thinking and creativity. I do my best to help them develop these skills, which is why I prefer coaching them to giving lectures. I believe that is the prevailing style of teaching at this grade level."

Public School Teacher A

"I would describe it as result oriented. Since I often work with individual students, I always try to clearly define goals for each student. Not what I want to achieve, but what they want to achieve, what they expect from our cooperation. Then, with their current level of language skills and personality, I put together a clear plan for the year, including milestones and tests, to regularly assess progress. ours. And that's when I choose my teaching methods, tailoring them to the project and the end goal we have with the students."

Public School Teacher B

"To be honest, I do not assist most of these classifications of coaching patterns and methodologies. It is lots of theory which may not be suitable for all students. I genuinely attempt my best with every student–that's the definition of my coaching style. It may also suggest one factor in a single lesson and then a totally specific one in another. But I don't like the use of a few empty classifiers that have not anything to do with the actual demanding situations we are facing withinside the classroom. I prefer to individualize each students learning so they can excel . "

Public School Teacher C

"I have always emphasized practice. The more hours spent understanding the better, and the more hands-on experience students can gain. First of all, from my experience, students love this form of learning - at least most of them do. And second, by applying what they've learned in a real life situation helps to prepare them for the real challenges they will face in the workplace when they are adults. Because at school, they work as a team, have conflicts, face deadlines, have to solve problems, record their results, even sometimes they have to perform multiple tasks. Of course, we cannot avoid theory entirely. But my teaching style is to maximize the number of hours students spend doing practical tasks."

5.4 | EXPERIENCING THE SCALE OF A CLASSROOM

Classroom interaction was explored and visualized by creating an installation through mimicking the design and layout of a typical public school kindergarten classroom in Ontario. Recorded audio from a kindergarten classroom from a full day of interactions such as before/after school, teacher-student, student-student, gender, work time, play time, and recess time. The installation consisted of a cork board with the weekly focus for the students and a white board which included the schedule for the day based on the audio, so the view can follow along, and the spatial layout of a standard classroom. There was also a carpet to show the main gathering space and scaled desks and chairs with pencils and paper laid out for the viewer to use and feel like they are sitting in a classroom.

The question explored during this experiment is, what are students' activity levels and interactions in a typical kindergarten class? Through this question the types of interactions between students and the visual and spatial relation of a typical classroom design with the students was explored. Some comments and reactions from professors and students when experiencing this installation are:

"I remember my kindergarten class looked sort of like this"

"I feel like I'm actually sitting in a kindergarten class"

"I remember when I did show and tell"

Figure 40: Kindergarten classroom bulletin board

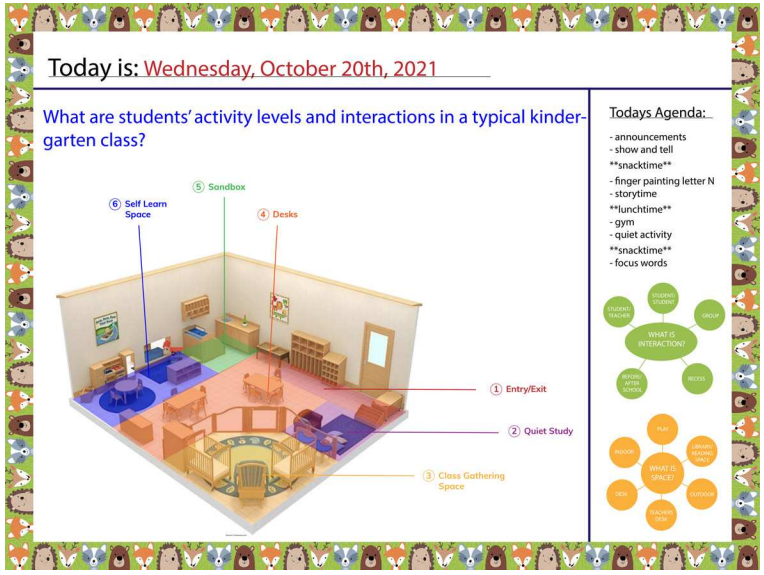


Figure 41: Kindergarten classroom white board

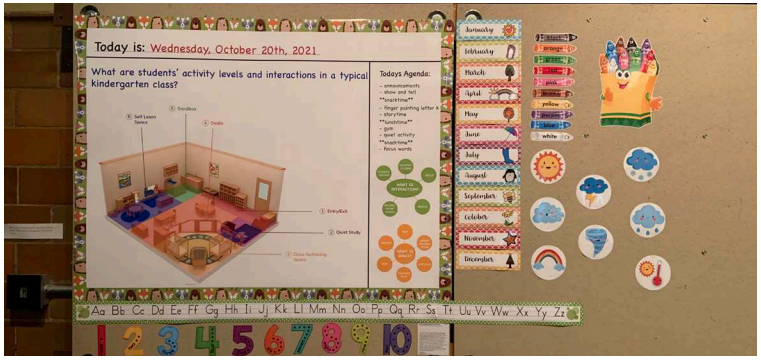


Figure 42: Image of classroom display

Figure 43: Image of classroom display

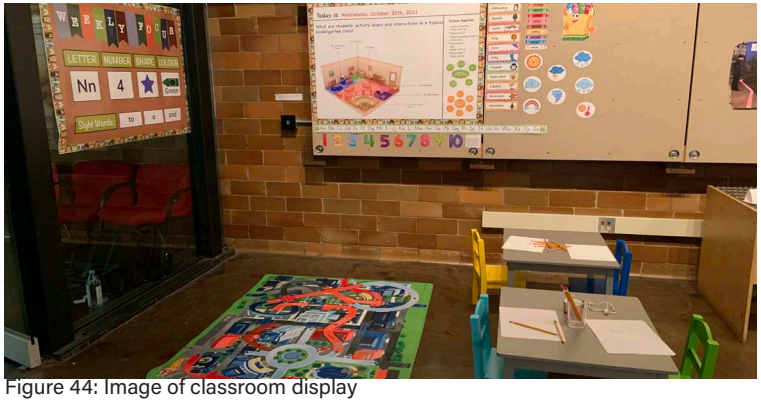


Figure 44: Image of classroom display

Figure 45: Image of classroom display

5.5 | UNDERSTANDING KEY PERCEIVED ISSUES IN A CLASSROOM

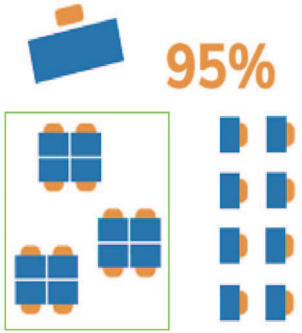
In order to understand today's classroom issues and current conditions, there was a survey sent out with 10 question to teachers all accross ontario. This survey received 44 responses.

As a result, many schools in ontario are lacking in natural lighting, a variety of seating (sifferent learning environments), sensorial aspects and a modernistic approach. Ontario schools need to act immediately on these downfalls becuase it it taking away from a child's learning.

My current classroom has natural light sources. (ex. windows)

42%

My current classroom has desks in groups rather than alone.



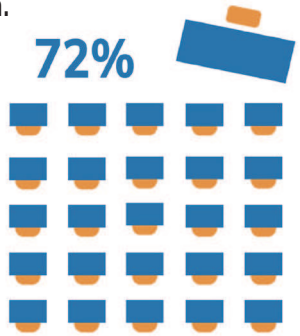
95%

My current classroom is bright and well lit.

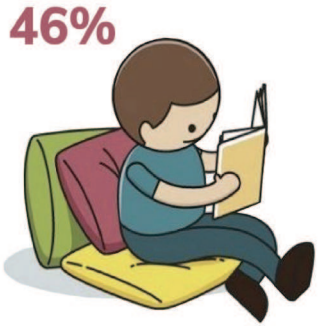
37%

My current classroom has all students facing the same direction.

72%



My current classroom has a separate area for quiet study.



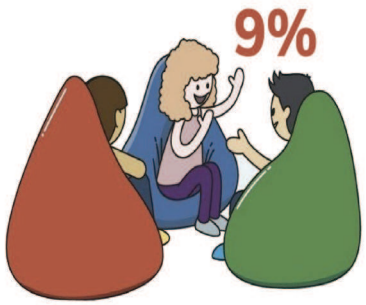
My current classroom design/layout has changed/improved based on students learning. (has it changed in the past 3 years?)

My current classroom allows for students to engage in group work easily.

My current classroom blocks out unwanted noises from outside the classroom.

My current classroom has modern technology for students to learn with. (ex. smartboard, pad, laptop, etc)

My current classroom has flexible seating. (3+ types)



5.6 | UNDERSTANDING THE ELEMENTS THAT ARE LACKING IN THE CLASSROOM

1 **CLUTTERED DISPLAY BOARD**
difficult to focus on the screen/ whiteboard

2 **STANDARDIZED SEATING**
does not encourage bouncing or rocking, which are forms of stimming/ self-soothing

3 **ART WORK DISPLAY**
bright colors and excess information can be visually distracting and overbearing

4 **WINDOWS**
lack of natural lighting and fresh air

5 **FURNITURE**
one size fits all, lack of diversity in learning space

6 **LACK OF ZONES**
no quiet zones or places designated for retreat when feeling overwhelmed/ alone time

7 **NO SOUND ABSORPTION**
lack of carpet/materials that would damper classroom sounds

8 **LIGHTING**
flicker of fluorescent lights can be uncomfortable and irritating

Figure 46: Ontario Classroom

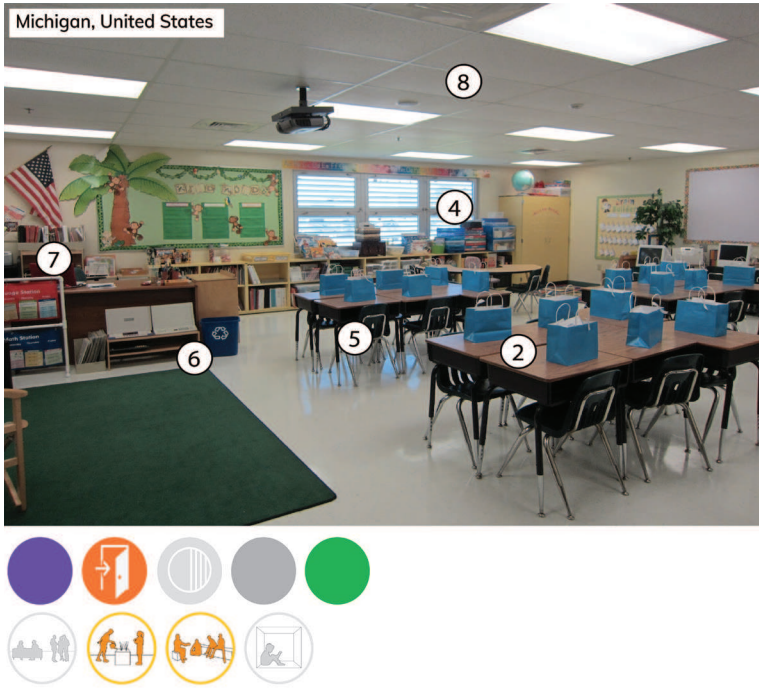


Figure 47: Michigan Classroom

Figure 48: Austrailia Classroom

6

Outdoor Space

6.1 | HOW DOES OUTDOOR SPACE IMPACT LEARNING?

Ming Kuo, Ph.D., conducted a study on how green space and nature help children learn. She focused on how nature affects children and how they attend to and engage in the classroom, how much they can concentrate, and how well they get along with teachers and peers.

1. Nature restores children's attention.

   Attention is important when learning. Many children struggle with focusing because of distractions, mental fatigue or ADHD. Spending time in nature helps restore children's attention. This results in them being able to focus better and perform better on tests.

2. Nature relieves children's stress.

   Children stress less when they are in nature. There are studies that prove that teachers having class outdoors once a week enhances their performance of evaluations and significantly improves their daily cortisol patterns.

3. Nature helps children develop more self-discipline.

   Many children struggle with impulse control which impacts their learning at school. Research proves that green space helps children have more self-discipline and concentrate better. In addition, parents with children who have ADHD reported that participating in outdoor activities reduces their symptoms.

4. Outdoor instruction makes students more engaged and interested.

   Ming Kuo states that "research suggests that kids are more engaged in learning not only during outdoor classes but also upon returning to their classroom afterward—even if the subject they return to is not nature-related." (Kuo, 2019)

5. Time outdoors may increase physical fitness.

   Physical fitness is very important, but one this that is not always considered is that it plays a big role in learning. For example, cardiorespiratory fitness supports cognitive processing and surveys show that students who have higher fitness levels do better in school. In addition, being outdoors encourages children to be more active, resulting in them being in better shape as they age.

Figure 49: Outdoor learning
Source: Purdue University

6.2 | OUTDOOR CLASSROOMS AROUND THE WORLD

Schools serve as a springboard for children's creative learning. They are one of the most influential places in shaping the brains of young people, and they bear a significant duty in providing them with favourable experiences. However, it is frequently observed that school outdoor spaces are simply left as playgrounds with little or no personality, despite the fact that students prefer to spend their school days outside rather than inside. The outdoor environment's crafted spatial expression is so crucial and significant for children's overall development that it should be carefully designed.

Experiential learning that occurs outside of the realms of architecture and education is referred to as outdoor learning environments. School outdoor spaces should allow students to encounter, investigate, and interact with a variety of natural phenomena, other people, and themselves, allowing them to learn and grow as a result. Outdoor play is thought to be one of the most effective ways for children to learn. The physical environment and behavior are intertwined because one influences and is influenced by one's surroundings via the 'affordances' available. Here are a few examples from around the world:

Figure 50: Outdoor learning
Source: Rethinking the future

Figure 51: Outdoor learning
Source: Rethinking the future

Figure 52: Outdoor learning
Source: Rethinking the future

Figure 53: Outdoor learning
Source: Rethinking the future

Figure 54: Outdoor learning
Source: Rethinking the future

Figure 55: Outdoor learning
Source: Rethinking the future

7

Design Principles for Experiential Learning

7.1 | SUSTAINABLE

Prioritizes the **HEALTH** and **WELL-BEING** of students in an indoor space.

Driven by **SOCIAL AND BEHAVIOURAL THEORIES** that impact the **ACTIONS** of a pupil in a classroom.

[air quality, natural lighting, and natural building materials]

Figure 56: Sustainability

7.2 | PLAY

MULTIFUNCTIONAL SPACE designed for **PLAY-BASED LEARNING** that gives an **EXPERIENCE** that is remembered.

Base on **ALL LEARNING THEORIES**.

[niche, holes, nooks in the wall, customizable and movable materials]

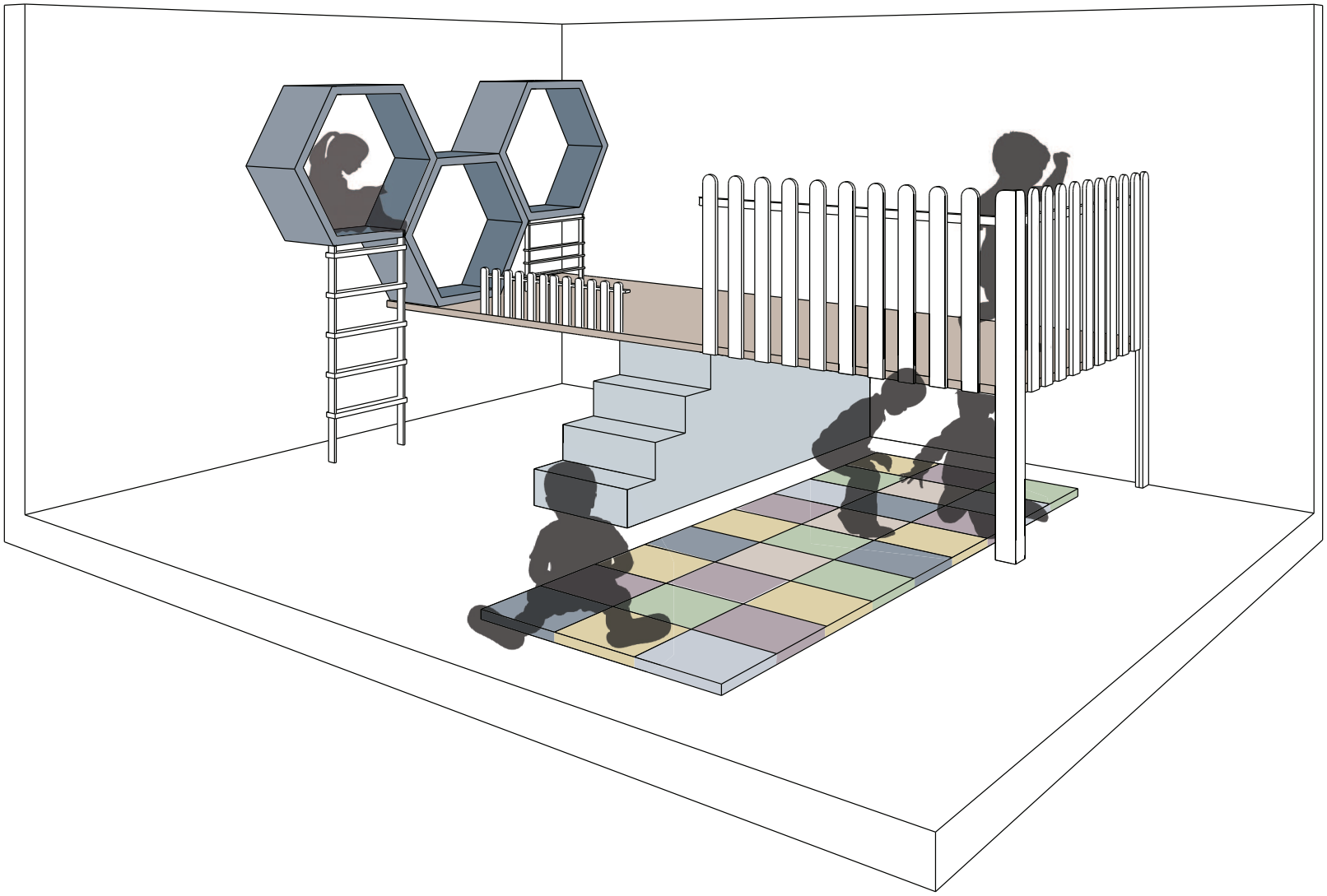


Figure 57: Play

7.3 | SCALE

Designing at scale for students provide a **COMFORTABLE** and **STIMULATING ENVIRONMENT.**

EXPERIENTIAL LEARNING THEORY allows the pupil to learn through exposure.

[scale of rooms, materials, furniture, window height]

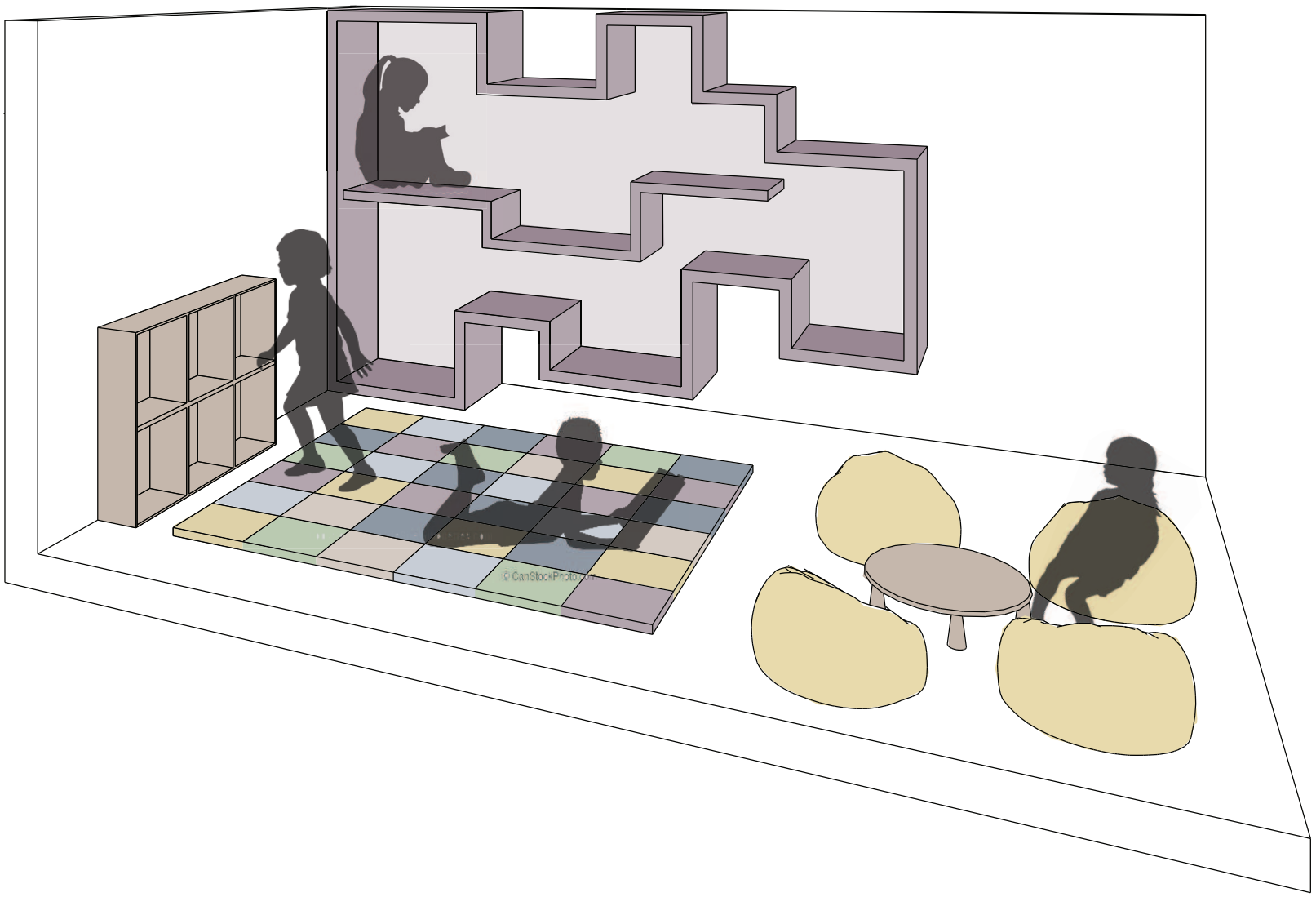


Figure 58: Scale

OPEN-PLAN ENVIRONMENTS are beneficial for **SOCIAL DEVELOPMENT.** It allows for pupils to share their skills amongst their peers.

CONNECTIVISM AND COGNITIVE THEORIES call for open layout learning from one another in an open space.

[connection between two or more classrooms, free customizable space]

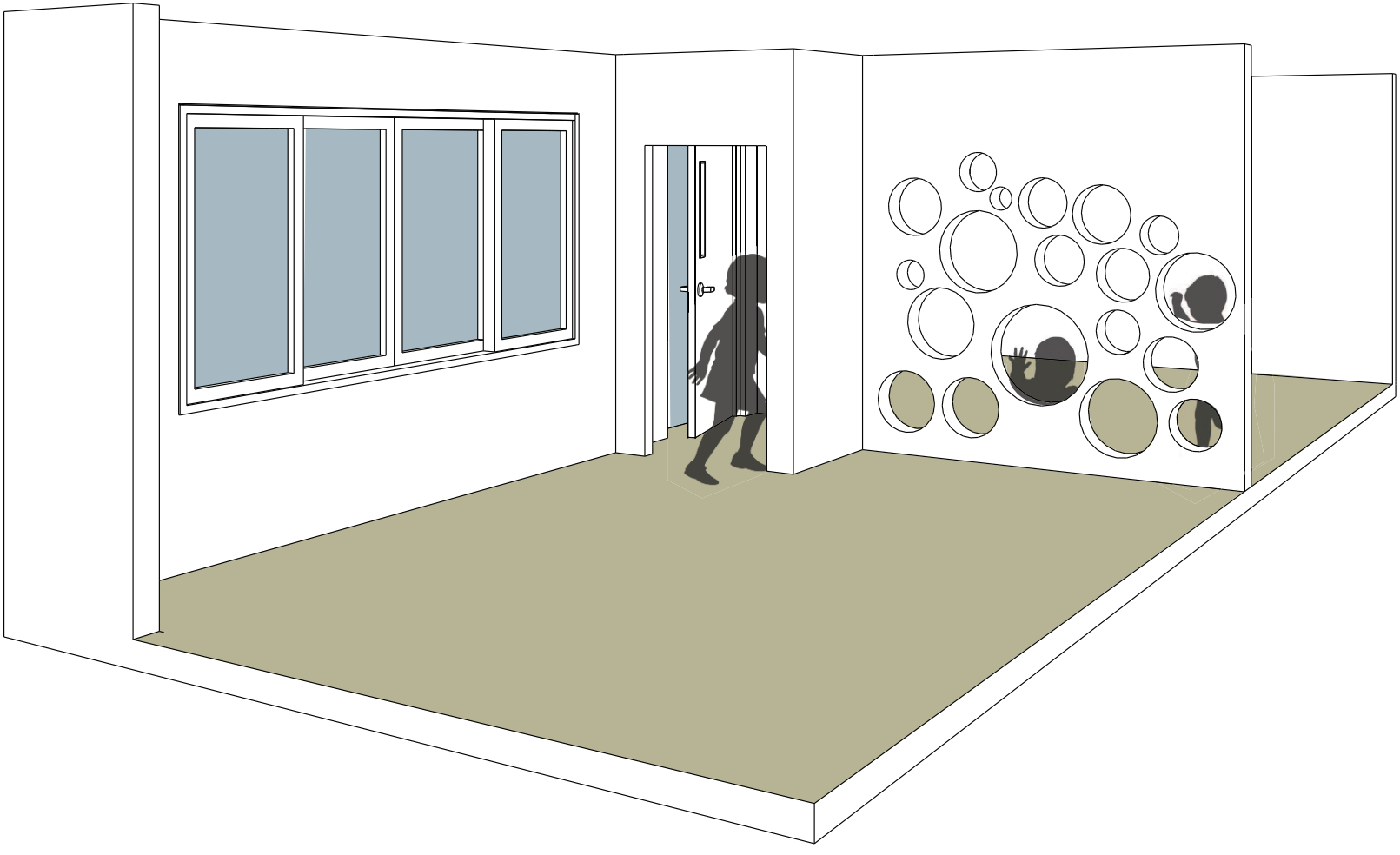


Figure 59: Open-Layout

7.5 | SENSORY

The creation of contrasts in a learning space allows pupils to learn through **VISUAL INTEREST.**

EXPERIENTIAL AND CONNECTIVISM THEORIES allow developing knowledge through senses.

[shapes, forms, sizes, textures, and depth]

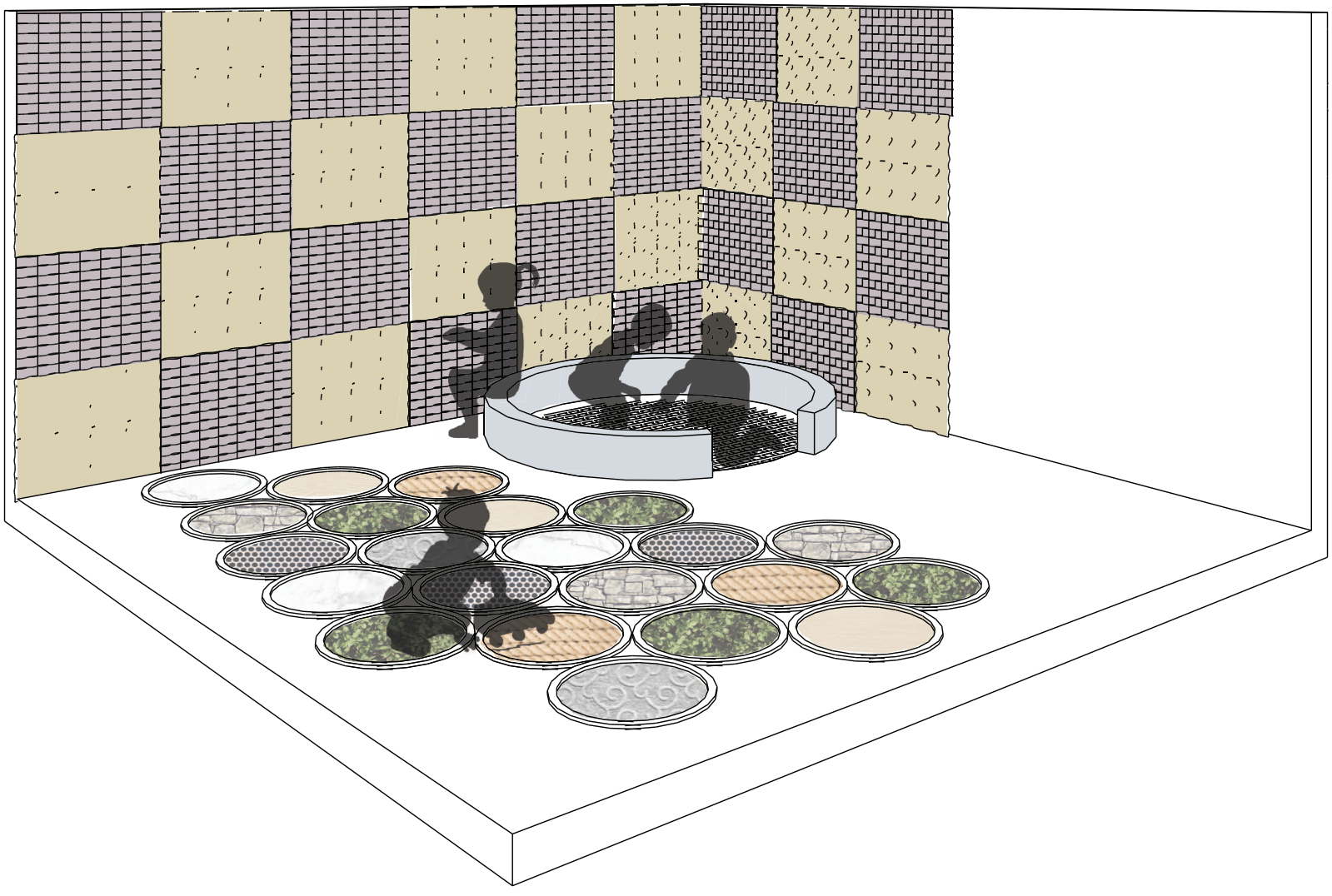


Figure 60: Sensory

8

Ontario Design Standards

8.1 | TDSB DESIGN STANDARDS

The Toronto District School Board (TDSB) Elementary School Design Guideline is a handbook that governs the design and standards of renovations, additions, and new elementary schools from junior kindergarten to grade 8. This handbook provides example floorplans of typical classroom standards and layouts for schools in Toronto (Figure 61).

The design guidelines for a kindergarted classroom are as follows:

DWG. NO. C3.1.1.1.a Kindergarten Classroom
Prescribed Floor Area EDU: 111 sq. m (1,200 sq. ft.)
Prescribed Floor Area TDSB: 111 sq. m (1,200 sq. ft.)

- Locate this area on the ground floor with direct access to the exterior.
- This space includes a washroom area and coat storage cubbie area within the room.
- Windowsills shall be at child height, approximately 600 mm above finished floor.
- Floor finish shall be sheet goods. Wet area (coat storage/ cubbie area) may be sheet goods or porcelain tile flooring.
- Coat storage and cubbie millwork required for 33 students.
- Washroom area to include minimum one water closet complete with privacy partition.
- Washroom areas may be designed as shared spaces between two kindergarten classrooms if design permits.
- Design entrance to washroom area to minimize disruption by either classroom.
- Locate washroom sink just outside of washroom stall beside classroom sink.
- Discuss with the Design Coordinator the option to design suites of kindergarten classrooms with a shared entrance vestibule and corridor to house cubbies, in lieu of in the classroom.
- Exterior toy storage shed to be provided in fenced kindergarten play area.
- Discuss with the Design Coordinator the inclusion of whiteboard and tackboards mounted at low height for student use.

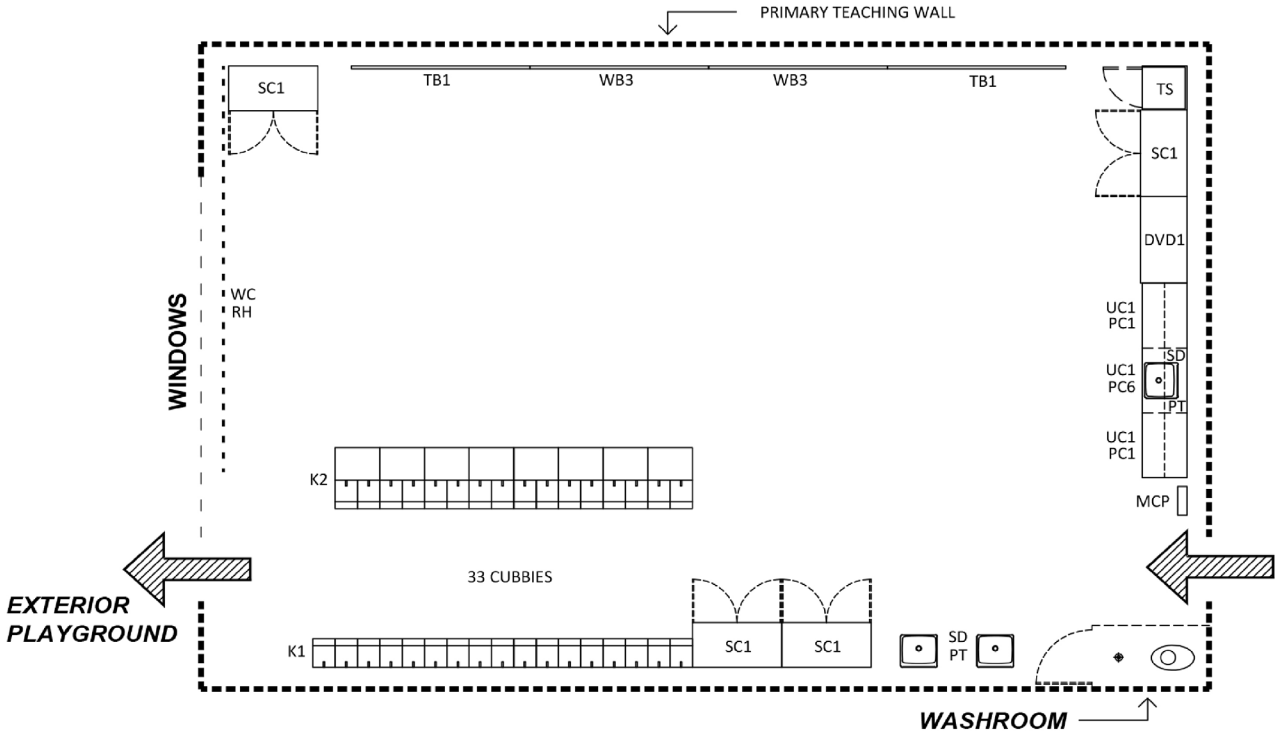


Figure 61: TDSB Guidelines

8.2 | IDEAL CLASSROOM LAYOUT

The process of designing an experiential learning environment first begins with imagining what the ideal classroom conditions would look like. Referencing the back casting methodology that was covered in the previous chapters, the author explored diverse ways to incorporate the Principles of Experiential Design in the ideal interpretation of the envisioned kindergarten classroom. The focus is to develop a kindergarten classroom for 30 students with the intention of maximizing diversity and flexibility in the learning environment. Beginning with referencing pre-existing dimensions and classroom standards in Ontario as the starting point.

Using the 70 square meter prescribed classroom floor area that is approved in the design handbook as a guideline; a simple diagram of how the space can be interpreted as the ideal classroom using the Principles of Experiential Design.

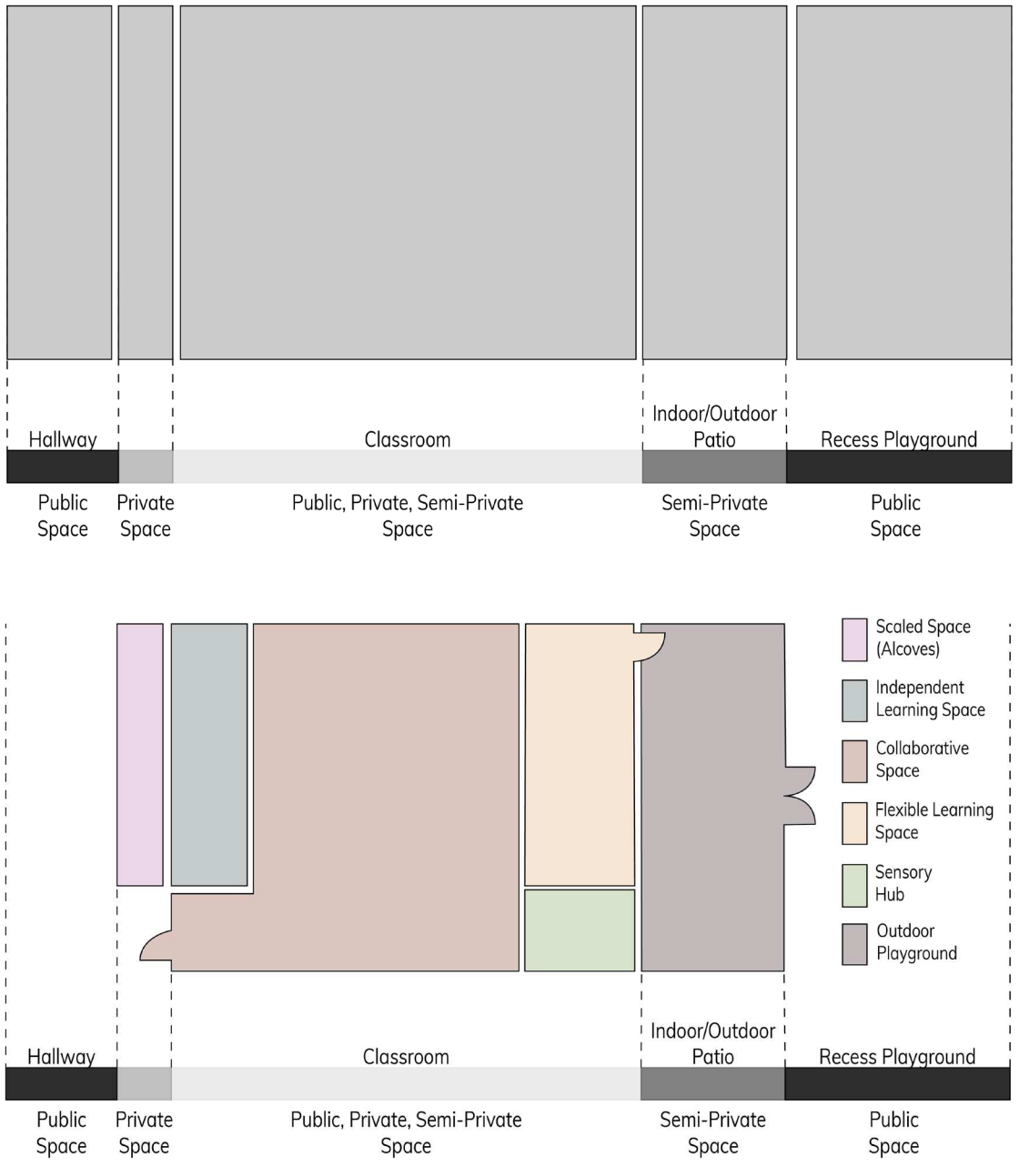


Figure 62: Classroom Layout using TDSB Guidelines

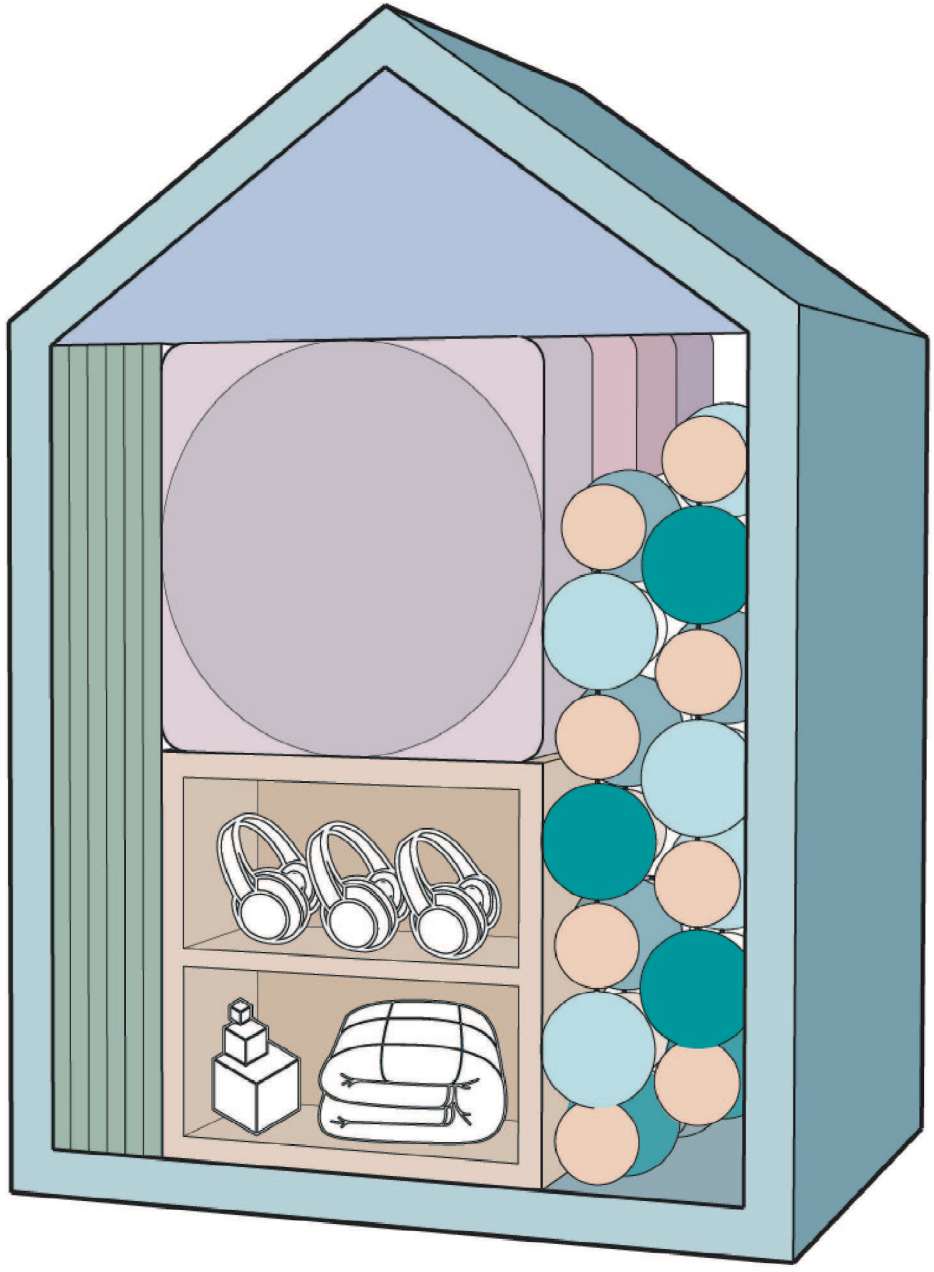
9

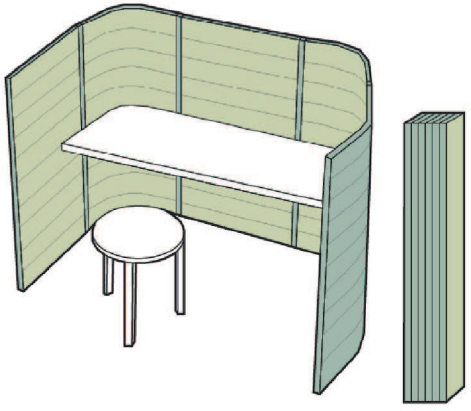
How to change your classroom

9.1 | DIY EXPERIENTIAL HUT

The EXPERIENTIAL HUT, is made up of 30 different elements. this hut may turn a classroom into a series of microenvironments that are accessible to all children. Since the typical Ontario classroom holds 33 students, there is something for almost everyone. This kit includes soundproofing panels, different seating techniques, and sensory elements to enhance the students experience. The variety of elements allows the students to customise their settings.

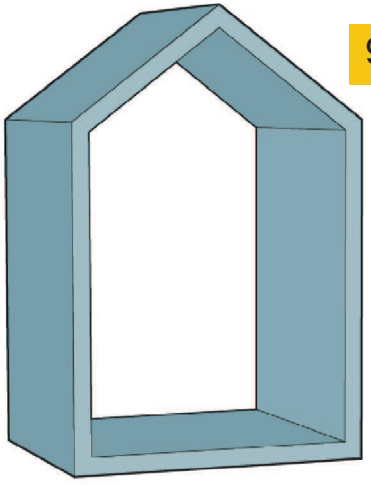
The kit's components are composed of environmentally friendly materials, and the shell itself can be utilized as a private retreat or quiet learning space. If the kit is no longer required in one classroom, it may be readily packed and transported to another, making it versatile and adaptable to varied learning environments. This kit is designed to come in 2 different sizes, it includes a child sized one (this one) and a larger one for teenagers. this kit can be utilizes in all school types including highschools and collage campuses.





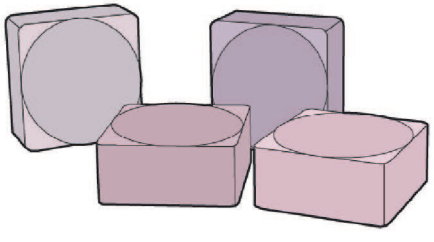
WORKBAYS

These workbays are sound proof, light weight and versatile. They can be used multiple ways , such as being connected, bent, curved, used as seating, etc.



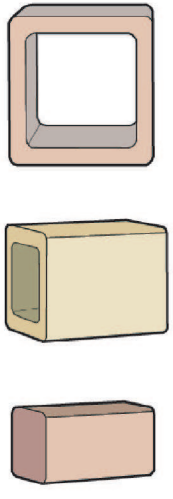
RETREAT SPACE

The casing is made of recycled plastic. It can be used as a quiet and/or private study space. It is small enough that some students may be the same height as it.



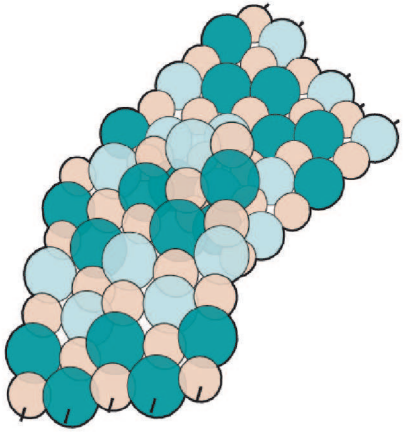
MOVABLE SEATING

These seating cubes come with a thick vinyl cover with varius filler materials such as feathers, buckwheat hulls, poly pellets, etc.



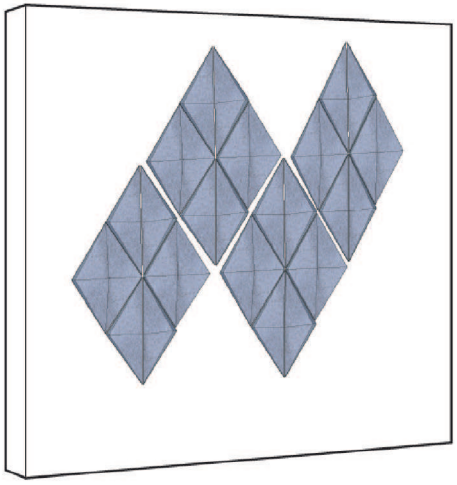
STACKABLE SEATING

These seating blocks are made of recycled tires, they are a sturdy rubber material, they can be stacked and be used as a table and chair or as a step stool.



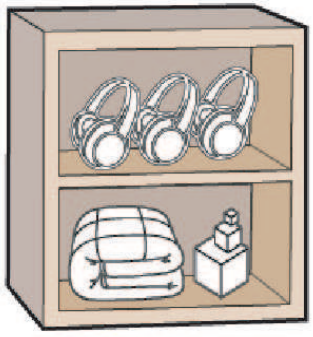
ADJUSTABLE BALL LOUNGER

This is a weighted sheet of connected balls in different materials that can be used as seating.



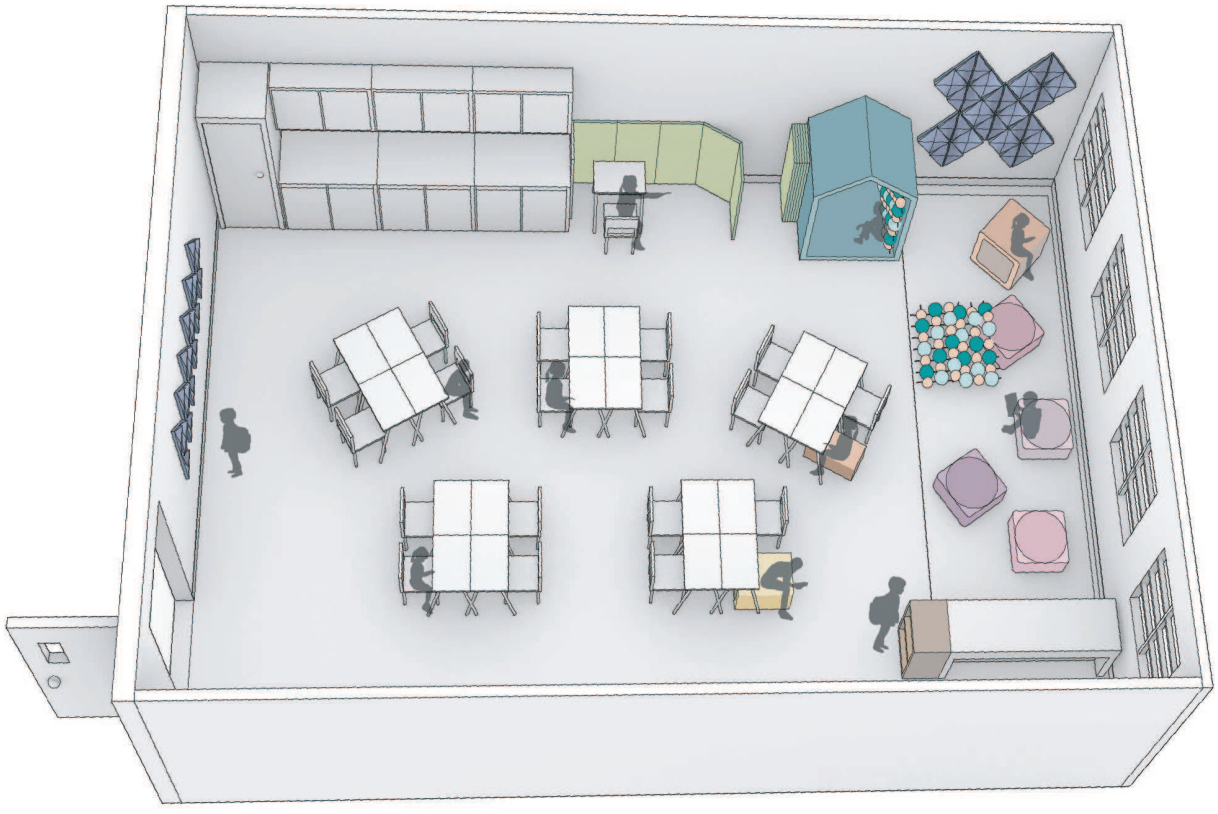
SOUND ABSORPTION PANELS

These panels can be attatched to the walls, or can be attached to one another to be a little cubicle. They are light weightas well.



BAMBOO SHELF

This shelf can be used as a stand up desk, as well as its purpose of a shelf to store small items in the classroom.



EXPERIENTIAL HUT BEING USED IN THE CLASSROOM

9.2 | FINAL THOUGHTS

I've taken an approach to understanding the role of processes in design throughout my graduate courses. As architects, we frequently underestimate the impact that the design process can have on the quality of our projects, focusing instead on the final product. We often rely on our preconceptions about what architecture should seem like based on precedents and internet research to gauge our comprehension of the users' demands.

However, how can we be so sure we're creating optimal surroundings if we don't assess user feedback and our recommended design solutions? By implementing the Principles of Experiential Design in creating a kit for current schools, I was able to gain a better understanding of how they can be used in any situation to improve a child's learning and how they can be readily altered in the future for other educational environments.

Looking forward, I imagine my work and research expanding in a variety of directions beyond simply architects designing schools. The format of my thesis allows for certain chapters to be tailored towards addressing different user groups in all ages because we all have a different way of learning. The intentions of my work are not only to encourage designers but to provide tools for everyday users to create more inclusive environments and re-think the educational space.

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Figure 45: Image of classroom display, Photo Credit: Bhavisha Mistry

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Figure 47: Michigan classroom, Source: https://www.careforkids.com.au/child-care/6vo7v/sutherland-st-childcare-and-kindergarten-kilmore-3764. Accessed 3 Apr. 2022.

Figure 48: Australia classroom, https://toddle.com.au/centres/orange-pre-school-kindergarten. Accessed 3 Apr. 2022.

Figure 49: Outdoor learning, Source: Purdue University, https://www.purdue.edu/newsroom/releases/2017/Q4/lets-go-outside-is-gaining-popularity-as-a-part-of-indiana-teachers-curriculum.html. Accessed 23 Apr. 2022.

Figure 50: Outdoor dining, Source: https://www.re-thinkingthefuture.com/designing-for-typologies/a2858-examples-of-outdoor-learning-school-spaces/. Accessed 25 Mar. 2022.

Figure 51: Outdoor dining, Source: https://www.re-thinkingthefuture.com/designing-for-typologies/a2858-examples-of-outdoor-learning-school-spaces/. Accessed 25 Mar. 2022.

Figure 52: Outdoor dining, Source: https://www.re-thinkingthefuture.com/designing-for-typologies/a2858-examples-of-outdoor-learning-school-spaces/. Accessed 25 Mar. 2022.

Figure 53: Outdoor dining, Source: https://www.re-thinkingthefuture.com/designing-for-typologies/a2858-examples-of-outdoor-learning-school-spaces/. Accessed 25 Mar. 2022.

Figure 54: Outdoor dining, Source: https://www.re-thinkingthefuture.com/designing-for-typologies/a2858-examples-of-outdoor-learning-school-spaces/. Accessed 25 Mar. 2022.

Figure 55: Outdoor dining, Source: https://www.re-thinkingthefuture.com/designing-for-typologies/a2858-examples-of-outdoor-learning-school-spaces/. Accessed 25 Mar. 2022.

Figure 56: Sustainable, Credit: Bhavisha Mistry

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Figure 58: Scale, Credit: Bhavisha Mistry

Figure 59: Open-layout, Credit: Bhavisha Mistry

Figure 60: Sensory, Credit: Bhavisha Mistry

Figure 61: TDSB Design Guidelines, Source: https://www.tdsb.on.ca/About-Us/Policies-Procedures-Forms/Policies. Accessed 2 Feb. 2022.

Figure 62: Classroom Layout using TDSB Guidelines, Credit: Bhavisha Mistry

APPENDIX

1. My current classroom is bright and well lit.
Agree
Neutral
Disagree

2. My current classroom has natural light sources. (ex. windows)
Agree
Neutral
Disagree

3. My current classroom has desks in groups rather than alone.
Agree
Neutral
Disagree

4. My current classroom has all students facing the same direction.
Agree
Neutral
Disagree

5. My current classroom has a separate area for quiet study.
Agree
Neutral
Disagree

6. My current classroom allows for students to engage in group work easily.
Agree
Neutral
Disagree

7. My current classroom has modern technology for students to learn with. (ex. smartboard, pad, laptop, etc)
Agree
Neutral
Disagree

8. My current classroom design/layout has changed/ improved based on students learning. (has it changed in the past 3 years?)
Agree
Neutral
Disagree

9. My current classroom blocks out unwanted noises from outside the classroom.
Agree
Neutral
Disagree

10. My current classroom has flexible seating. (3+ types)
Agree
Neutral
Disagree

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