Designing with Diversity in Mind: Co-Creating Inclusively Built Learning Environments

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A Paper Submitted in Partial Fulfillment of the Requirements for the Degree of

MASTER OF EDUCATION

In the Area of Curriculum and Leadership

Department of Curriculum and Instruction

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Abstract

School layout and design, the so-called third teacher, can wield considerable power for students with physical and learning impairments. Students who experience their world differently from the norm may be enabled by thoughtful, inclusive design; whereas non-inclusive architectural plans can exacerbate disabilities. This paper has its foundations in the ontology of disability, then builds atop this a structure for participatory school design. Groundbreaking architectural research points to the benefits of participatory planning, in co-creating inclusive learning environments *with* (not for) students with sensory impairments. This inspiration points the way to practical curriculum applications: a multi-level applied design unit plan that accesses and honours the unique perspectives of neuro-divergent and neurotypical students alike. Ultimately, engaging diverse voices empowers all students, which effectively informs school design and demolishes barriers to learning.

Keywords: ontology of disability, disability process, biomedical model, social model, third teacher, empathetic design, universal design, participatory design

Introduction

With the arrival of the 21st century, British Columbia renewed the province's education system, developing a New Curriculum to prepare citizens for the new millennium. This modernized curriculum is flexible, focuses on higher order learning, key concepts, and enduring understandings through a cross curricular lens as well as featuring and celebrating indigenous worldviews and knowledge (B.C. Ministry of Education, 2018). While this ambitious planned curriculum embraces a more holistic and inclusive way of learning, there is an underlying hidden curriculum that needs to be recognized and acknowledged as a powerful distractor from this cause. An unconscious schooling happens, in part, within and around our school's built environment. For marginalized groups, like those with physical or learning disabilities, these school buildings, with their entrances and exits, hallways, classrooms, bathrooms, and playgrounds, reinforce that the space was designed without them in mind and whisper the lesson: you don't belong. The designs for these buildings and spaces are relics that reflect the individualistic, normative thinking of an industrial age. Bateson's (1981) ecological thinking model describes how the root metaphors flowing from these blueprints or maps cannot change until we first change the environment in which we live and learn. If the built environment conveys a silent curriculum, how can we reframe and redesign this "third teacher" (beyond the teacher and parents) to create a more welcoming and inclusive learning environment (Hall, 2017)? How can we honour all the voices that need to be in that conversation?

Inspiration from my Lived Curriculum

I went to public school at a time when students with disabilities were kept away from mainstream students. School buildings reinforced this separateness; at my elementary school, students with disabilities and learning challenges were shuffled off to a small room out of sight

from the regular classrooms. The stigma of that room registered strongly with students and we dreaded any association with it. Perhaps more offensive though, was my three story, century old High School, where “those students” were cast out and set aside to work next to the boiler room in the basement. When I volunteered to work as a peer helper in “that room”, I could feel their desperation to connect with me and I could sense how deadening that space was for them. By the time my teaching career had started in the 90s, students with disabilities had been thankfully integrated into the mainstream, but the prejudices built up around them remained as fixed as the walls that were used to keep them out.

Early in my career I was known as a teacher who welcomed and accommodated differently able students in my classroom. However, I was running on intuition and drawing on a limited experience which didn’t sit well with me, so I set out to train in special education. It was during this time that I was introduced to universal design for learning and differentiation; these paradigm shifting concepts humanized how I approach planned curriculum to this day. UDL (Rose & Meyer, 2006) invited me to notice the optimal learning environment for my students and to empathize with their needs to identify and lift barriers to their learning when I designed lessons. Differentiation introduced me to modifying lessons for students who couldn’t access universally designed ones such that they could continue to work within the learning community. The creative challenge and problem solving inherent in this design approach reinvigorated and universalized my teaching practice.

Truthfully, it was my own lived experience with temporary disability that taught me just how much of a barrier built environments can be. Five years ago I was hit by a car, as a pedestrian, badly concussing my brain and injuring my left side. Although I took time off to heal, when I returned to my Integration Support teaching role, I found that navigating my way around

the school that I had worked in for years had become both physically painful and overwhelming to my senses. I knew where the automatic doors were, but found myself wanting more of them. I could get up to the second floor on the elevator, but walking that extra distance hurt. I ran my hand along the wall to remind myself of how to walk straight, but panicked when the wall came to an end because like many children with proprioception difficulties, I got disoriented in open space. I related to my students with autism; in some rooms the sounds ricocheted off the walls like bullets and rooms that were cluttered were a discombobulating visual assault. Like my students with learning differences, decoding meaning and thinking about text became exhausting. Often, I would become angry and frustrated which is not in my nature. I remember seeking refuge in the learning centre along with my students with behavior designations. I had organized the room to be calm, minimalist, and softly lit; I could see and feel first-hand where I had followed theory into practice well and where I did not. Although I am almost fully recovered, this experience made a lasting impression on me one that informs how I teach to this day.

Surveying for Significance and Importance

At the same that the Province rolls out its newly renovated planned curriculum, the Sooke School District is making plans for new learning environments to facilitate the curriculum's objectives. The Sooke School District's "Long Range Facilities Plan 2018 Update" anticipates that seven new schools need to be built within next the next 7 years and that as many as 7 existing schools will also need to be expanded or replaced and modernized over that time to keep pace with growth. These space plans are the product of accounting and enrollment forecasts, but the human element must also be added into the equation; from my reading of the reports, what still seems to be missing is empathy for those diverse users. The design plans must directly

consider how buildings and their features can trigger feelings of marginalization and otherness in some users. Furthermore, the planning must consider how to create an adaptable and accessible environment for differently able and neuro-divergent students; this is a critically important step in constructing a place of belonging as well as learning. If the building is in essence a third teacher, then explicitly recognizing its potential is key in this universal design process (Strong-Wilson & Ellis, 2009). The silent curriculum offers power to extend the value of diversity and interconnectedness within a community of human beings. It is important for the School District to listen generously and conduct a meaningful consultation with previously marginalized groups to design and construct inclusive and responsive environments that enable learning and realize potential.

Digging Deeper

Chapter 2 will outline my review of the literature, with a focus on identifying how learning environments can unwittingly reinforce binary ways of thinking around normality and abnormality that further marginalize and re-traumatize members of the learning community. A key aspect of my review will be exploring the ontology of disability itself distinguishing whether it is in fact the environment that disables or impairments. In turn, I will also address the culturally significant, epistemological shift in BC's new curriculum from a focus on content to relationships, especially as it relates to the potential to be found in the literature around Reggio Emilia's third teacher or silent curriculum. Building on this, my review will explore the transformative power of universal design to create inclusive, interactive, and generative spaces for a learning community. Finally, I will look specifically at how invisible disabilities have been and can be considered and consulted in architecting schools for the future.

Chapter 3, My Project, will focus on developing an inclusive consultation process for the 2023 new school build on Sooke's Sun River site. My review will be inclusive of the entire learning community, but with special consideration for a historically overlooked interest group: students with invisible disabilities. The literature shows that school building designs are already mindful of physical and visible disabilities. However, designing for underrepresented user groups, like those on the autism spectrum, is an emerging field of study in architecture and educational planning. My project will embrace this empathetic step in the design process; I want reach out to connect with those who are challenged by communication to learn about what they need and hope for in their schools.

Chapter 2: A Review of the Literature

Laying the Foundation: The Ontology of Disability

The World Health Organization's groundbreaking "World Report on Disability" highlights the challenges in defining disability, noting ongoing discussions as "complex, dynamic, multidimensional, and contested" (WHO, 2011, p. 3). In this section I will review selected literature from the Disabilities Studies field to explore the controversial and evolving ontology of disability.

Prior to the 1960s, disability was most commonly defined using biomedical explanations; this model centers on the individual and particular impairments or biological dysfunction. Seen through this clinical lens, disability is something to be labeled, treated, rehabilitated, or sorted out from the healthy normative group. I believe that our school system has traditionally subscribed to this approach to disability, with its long lists of special education designations and interventions – to a large extent, I might suggest this continues today. Us/them, normal/abnormal, able/disabled dichotomies are the unfortunate by-products of this medical approach and contribute to prejudice and exclusion. Contemporary disability scholars like Fougeyrollas & Beauregard (2001) challenge the limited scope of the medical model; "the physician has the tendency to concentrate on the physiological aspects and to overspecialize to the detriment of a more holistic vision of the human being" (p. 176). Simply put, ability extends much further than a medical diagnosis.

A social model of disability "shifts attention from individuals and their physical and mental deficits to ways in which society includes or excludes them" (Shakespeare, 2006, p. 29). According to this social constructionist view, disability is a product of the physical and social environment, not impairment. Disability rights activists have used this social model as a call to

action; “if people with impairments are disabled by society, then the priority is to dismantle these disabling barriers in order to promote the inclusion of people with impairments” (Shakespeare, 2002, p. 5). The social model politicized disability, advancing it into an emancipating human rights issue. Yet despite good intentions, the social model has also been widely criticized. Its linear cause/effect, problem/solution logic has mobilizing, catalytic appeal, but it also oversimplifies the situational and systemic intricacies of the disability creation process (Shakespeare & Watson, 2002).

The social model’s revolutionary focus on the impact of physical and social environments has swung the literature away from biology’s undeniable role in the disabling process. “Impairment and disability are not dichotomous, but describe different places on a continuum, or different aspects of a single experience” (Shakespeare & Watson, 2002, p. 24). Shakespeare (2002), a champion of disability rights, a lead scholar in the field of sociology and disability studies, and a key contributor to the WHO report on disability along with Watson (2002), a professor at the Institute of Health & Well Being at the University of Glasgow, call for a more holistic, embodied ontology of disability claiming that “the social model of disability has become a rigid shibboleth” (p. 9). Shakespeare, who has Achondroplasia, a bone growth disorder, asserts: “we are not just disabled people, we are people with impairments, and to pretend otherwise is to ignore a major part of our biographies” (Shakespeare & Watson, 2002, p. 11). A person’s experience with disability or living with an impairment is an undeniable part of their being. Shakespeare (2002) goes one step further to suggest that human beings are all impaired to some degree and that this shared experience has the potential to unite rather than divide. The “claim that everyone is impaired not just ‘disabled people’” (Shakespeare & Watson, 2002, p. 26) prompted a backlash from other disability scholars, most notably Hughes (2007), a professor of

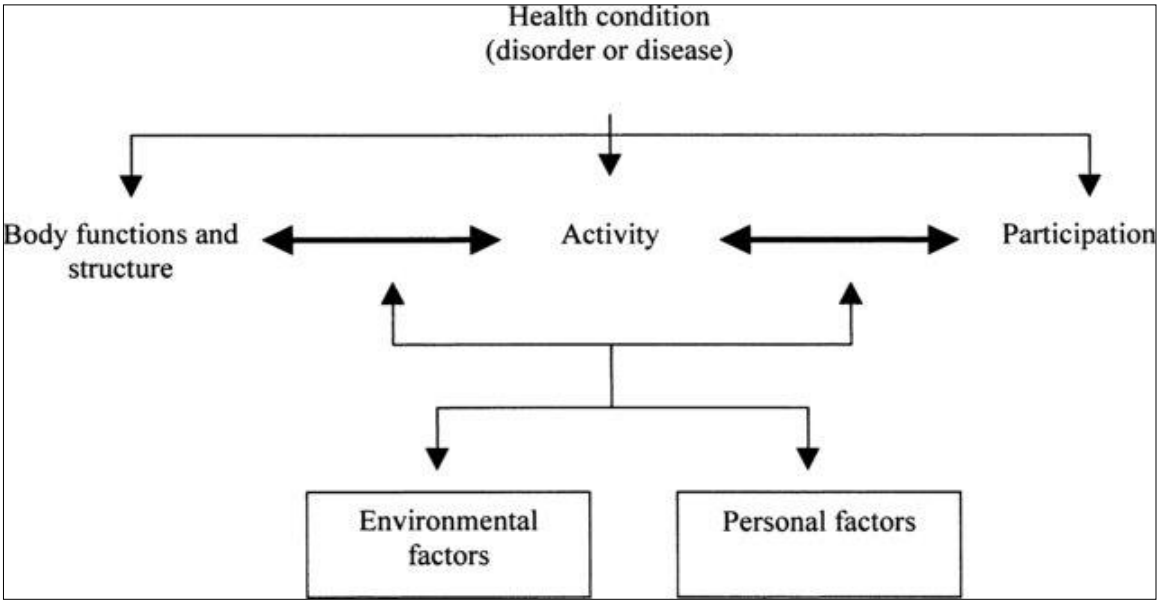
sociology at the University of Glasgow. Hughes (2007) urged: “while one might use this argument to get non-disabled people to think about disability and to recognize ‘the other’ in their own lives, it seems to me that turning the ontological problem on its head delivers to disabled people against discrimination a fairly hollow scholastic victory” (p. 677).

While disability theorists disagree whether impairment is ubiquitous and universal, there is some consensus that impairments vary from person to person. Certainly, the degree to which individuals are disabled by physical and social barriers is determined by the nature of their impairment. For instance, Shakespeare and Watson (2002) draw our attention to how individuals with visible impairments would have different experiences from those individuals with invisible impairments like autism or dyslexia; “visible impairments trigger social responses while invisible impairments may not” (p. 12). Individuals with conditions that are episodic or degenerative would experience disability sporadically or incrementally (Shapespeare & Watson, 2002). If the individuals with impairments experience and interact with their environment in ways unique to them, “removing environmental obstacles for someone with one impairment may well generate obstacles for someone with another impairment” (Shakespeare & Watson, 2002, p. 17). For example, “blind people may find that curb cuts which liberate wheelchair users make it difficult for them to differentiate pavement from road and leave them vulnerable to walking into the path of a vehicle.” (Shakespeare, 2006, p. 46). A change in the environment may enable one group of people with one type of impairment only to oppress and further disable another.

Fougeyrollas and Beauregard (2001) trace the World Health Organization’s revision of *The International Classification of Impairments, Disabilities, and Handicaps* (ICIDH) to illuminate how multifaceted and contentious the disability process is within the global community. The current ICIDH-2 framework is based on the same fundamental relationship

between the trilogy of body, person, and society identified in earlier versions of the taxonomy. WHO's team of advisors could agree that the disability creation process was relational, but there was debate around the role played by each of the determinants in disability. Figure 1, WHO's Conceptual Schema of the ICIDH-2, attempts to show the dynamic interaction between determinant factors in disability, but critics contend that it does more to confuse than clarify this complex relationship. Interestingly, earlier versions of the schema were criticized for being too linear and simplistic.

Figure 1. Conceptual schema of the World Health Organization ICIDH-2. 20



(Cited in: Fougeyrollas & Beauregard, 2001, p. 17)

Critical Disability Studies (CDS) developed over the last decade to interrogate the discourse around disability and to better understand the lived experiences of disabled people. With CDS, "autonomy and social participation can serve as beacons, but the contours of these concepts must remain flexible and amenable to the vicissitudes of history and critical thought itself" (Meekosha & Shuttleworth, 2009, p. 64). Meekosha, a disability activist and founding

member of Women with Disability, and Shuttleworth, a medical anthropologist, explore CDS in their article, *What's so 'critical' about critical disability studies?* (2009). The authors identify some of the complex variables at play in disabled peoples' lives to make a strong case for CDS's rigorous critical reflection around those emergent realities. When gender, sexuality, class, ethnicity, geo-political factors, and post-colonial legacies are layered into academic conversations around disability, it becomes clear that impairment disability identities are "contextual, fluid, multiple, and intersecting" (Meekosha & Shuttleworth, 2009, p. 61).

No matter how disability theorists conceive disability, all of these theorists appear united in two fundamental truths regarding disability: first, that disabled people are not valued as equal members in society and, second, that disabled people face discrimination because they are different. A culture of accessibility recognizes the value of disabled people and creates environments that may not dismantle disability altogether, but pave the way for genuine and meaningful inclusion (WHO, 2011). Schools should embody this culture, not only in their social structures and curriculum, but it should be built into their physical structures as well.

Taking Down Barriers with Empathetic Design

If the built or physical environment can exacerbate impairments and contribute to a disabling process, then empathetic, user-centered design is a way to alleviate that hardship and enable inclusion. Following the 2006 United Nations Convention on the Rights of Persons with Disabilities, many countries adopted non-discrimination laws that insist on accessible environments (Persson, Ahman, Yngling, & Gulliksen, 2017, p. 506). Here I review some of the key literature around designing inclusive and accessible environments. Barrier Free Design, Design for All, Universal Design, Inclusive Design, User Sensitive Inclusive Design, Accessible

Design and Participatory Design are different schools of design thinking that empathize with the spectrum of humanity to design accessible, welcoming physical environments.

Barrier free design came to the fore in North America in the 1950s. Many veterans returning from the Second World War, the Korean War, and the Vietnam War had sustained injuries that impacted their mobility and functionality, so there were mounting political pressures to help these service people rehabilitate and reintegrate back into society. Enabling legislation, product guidelines, and building design standards were directed at improving usability and accessibility for veterans who had lost the function of a limb or used a wheelchair (Albrecht, Seelman, & Bury, 2001; WHO, 2011). Some examples of barrier free products and building designs include one handed blenders, remote controls, wider doorways, and ramps. Veterans were considered valuable citizens who had sacrificed to serve their country and were therefore worthy of these consideration and design efforts. However, other people with disabilities tended to be seen as charity cases existing on the fringes well away from any design lens. Nevertheless, these innovations benefitted them by proxy.

Fortunately, as our conception of disability has become more nuanced and representative, "likewise, the approach to design that accommodates people with functional limitations has changed from a narrow code of compliance to meet the specialized needs of a few to a more inclusive design process for everybody" (Ostroff, 2011, p. 36). The 2009 United Nations Convention on the Rights of Persons with Disabilities signified a global re-evaluation of disability in society and a seismic paradigm shift which rippled out into the design community. Empathy-driven, user-centered design approaches gained much-needed momentum by this drive for a world-wide "culture of accessibility" (WHO, 2011, p. 169). Design for All, Inclusive Design, User-Sensitive Inclusive Design, Accessible Design, Cooperative/Participatory Design,

and Universal Design are approaches that answer this call for sustainable design. While each of these design approaches has a different origin and history, they are "merging and becoming increasingly difficult to distinguish from each other" (Persson, Ahman, Yngling, & Gulliksen, 2017, p. 510) because they are directed at the same goal, accessibility.

The term accessibility itself is contentious, however. Irwarsson and Stahl (2009) make a plea for a shared language in accessibility research and practice especially with regards to "accessibility". They complain that the ambiguity surrounding this term is compounded by "considerable unconsciousness, ignorance, inconsistency and even disinterestedness among the actors as concerns conceptual definitions to the core constructs being used" (p. 57). The current dictionary, legislative, theoretical, and practical definitions of accessibility differ. However, it can be argued that this morphing definition is in large part a reflection of the diverse and dynamic nature of humanity and the environment. For that reason, Persson, Ahman, Yngling, and Gulliksen (2017) suggest "that a discourse on accessibility should focus on the flexible ever changing gaps between a person's ability and potential activity in a changing environment" (p. 523). Looking to bridge those gaps is a challenge that empathetic designers embrace.

Of the empathetic design approaches, Universal Design (UD) is perhaps the most applicable to the field of education and is relied on to create both accessible schools and curriculum. Ronald Mace, an architect, coined the term UD, which became attached to the revolutionary idea to proactively design physical environments so that they could be accessed by wider range of users (Wilkoff & Abed, 1994; McGuire, Scott, & Shaw, 2006). Mace "captured and illustrated an elusive element of inclusion; the anticipation and acknowledgement of human diversity as a norm" (McGuire, Scott, & Shaw, 2006, p. 168). Previous designers tended to be self-focused and autobiographical in their approaches (Ostroff, 2011); being able-bodied, their

perspectives reflected a “norm” based on a fully able person. Mace, on the other hand, uses a wheelchair and it is perhaps unsurprising that his divergent perspective conceived designs that were sensitive to the demands of a wider range of bodies. His experience developed the empathy and emotional intelligence that is at the heart of UD.

The fundamental goal of UD is to create products and design environments that enable as many users as possible. UD’s design is preferred in part because planning products and buildings to serve individuals and groups with specific impairments in advance of construction is less costly and disruptive than retrofitting. However, it is commonly understood that a truly universal design is not achievable, as there will always be people who cannot use an item or access a space no matter how thoughtfully it is designed (McGuire, Scott, & Shaw, 2006, p. 168). Composing a universal design that has any hope of addressing “the bewildering wide range of design interventions” (Jones, 2014, p. 1370) outlined in the UD guidelines is a monumentally daunting task because it would involve anticipating so many diverse user needs. Furthermore, Jones (2014) argues that the UD approach disenfranchises the very users it aims to serve by situating them in a passive role. The hierarchical relationship places the designer or expert at the top, distributing solutions to the users and laypeople below. Jones (2014) proposes that citizens must be involved in materially shaping the outcomes of a participatory design process or risk reproducing a ‘‘scenic’’, disempowered, notion of the user (p. 1372). Designing architecture necessarily requires some notion of the types of bodies that will use the built spaces, but UD must include participatory elements to be more democratically aligned. The voices of the diverse users must be heard in the design process. Imagine schools and curriculum created with and for diverse students; how powerful would that collaboration be? How could the built environment of that school foster and grow a culture of accessibility?

Scaffolding with the Third Teacher

In this section, I will review the literature to investigate how the learning environment, that "third teacher", can work with and for differently able students rather than against them. A thoughtfully-designed classroom that recognizes human variance maximizes the potential in the room, building on strengths and diversity rather than sorting out deficiencies and hammering conformity.

Schools that were designed and built in the Victorian Era reflected the educational values and beliefs of that time period. Teachers, the transmitters of knowledge, taught students, the passive receivers of that knowledge, following a factory model designed to roll out productive workers to serve in the voracious Industrial Revolution (Dewey, 1956). Classroom arrangements positioned the teacher firmly at the front of the room to reinforce their expertise and authority over the pupils. Classrooms themselves were box-like in their design, compartmentalizing age, subject focus, and ability. These schools quite literally did not have room for differently able students, who were not valued by society or in the industrial equation that formulated the instruction and construction of schools (Albrecht, Seelman, & Bury, 2001; Lipman, 2010; Shakespeare, 2006).

While disabled students have been successfully integrated into mainstream schools and classrooms, the designs of these schools and classrooms continue to have what Weinstein (1981) refers to as "direct" and "symbolic" effects on student performance and inclusion. Direct effect refers to the pragmatic consequences of particular school architecture or classroom arrangements. Symbolic effects, on the other hand, are the values that these designs communicate to users. For example, Weinstein (1981) suggests that desks arranged in rows have the direct effect of making discussions difficult. The symbolic effect or message in this

arrangement is that conversation is not valued. Extending Weinstein's (1981) example to include the perspective of disabled students, rows could intensify feelings of isolation by discouraging students from asking for help or direction and highlight that fitting in is valued over standing out. While Weinstein recognizes the importance and the significance of the learning environment, she does not believe that it "teaches" (p. 12). It is unclear whether Weinstein (1981) made this statement to directly counter the Reggio Emilio concept of the learning environment as the third teacher, but it does highlight some debate around what constitutes the act of teaching.

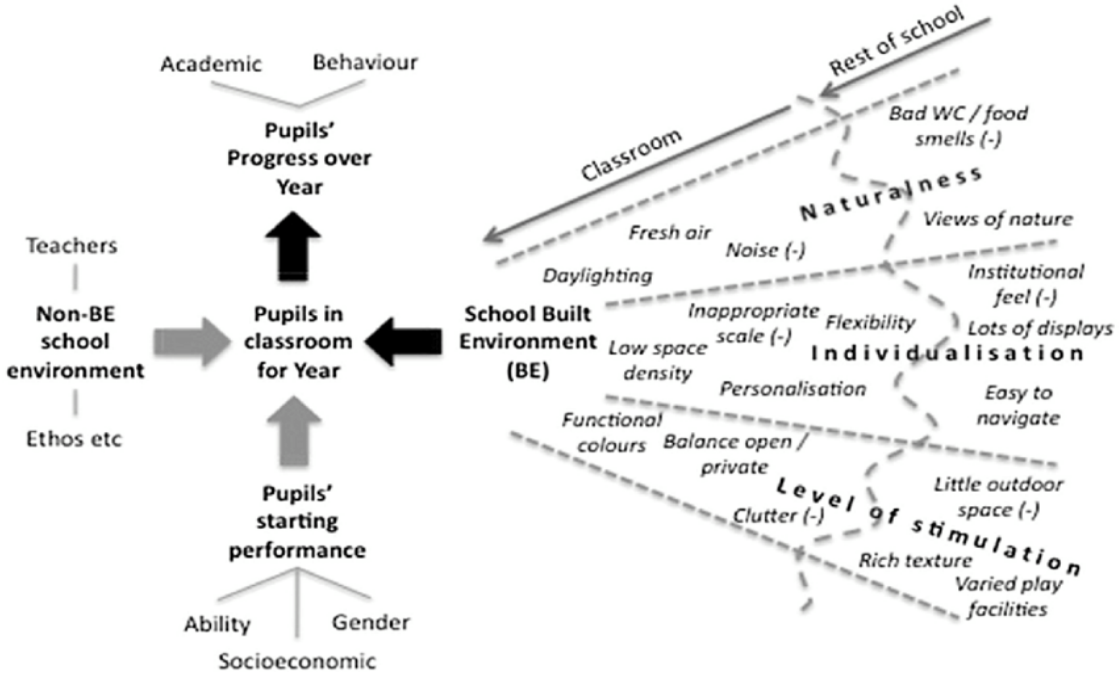
Whether or not a learning environment teaches or simply facilitates learning, Strong-Wilson and Ellis (2007) contend that it is a "key source of provocation and insight" (p. 40). Like Weinstein, these authors challenge educators and designers to "look again at the messages and invitations contained within their classroom surroundings" (Strong-Wilson & Ellis, 2007 p. 41). In keeping with the Reggio Emilio approach, Strong-Wilson and Ellis ascribe equal value to the third teacher, the learning environment. One lesson that this third teacher delivers with mastery, is Reggio Emilio's principle tenet of practice, "social reform through access and equity [as well as] the notion of children's democratic rights as citizens" (Lindsay, 2015, p. 449). Lindsay identifies and explores John Dewey's philosophical and foundational influence on the Reggio Emilio school of thought. Dewey (1956), whose progressive, socio-constructivist ideas ran against the status quo of the factory model education of his time, advocated for learning environments that championed democracy and citizenship skills. Democratically conceived schools and classrooms are student-centric and are designed to welcome every student to participate regardless of their background or ability. Robson and Mastrangelo (2017) emphasize and celebrate the variant nature of these democratically constructed learning environments: "when preparing the school environment, it cannot be copied, only created, as it needs to reflect

the children, families, educators, and community encompassing the school" (p. 1). Hall (2017) also addresses this shift in school building design; "What is especially noteworthy in the contemporary educational context internationally is the increasing diversity in school building design, reflecting a welcome, greater focus on bespoke development to suit embodied and inclusive pedagogy; the needs and requirements of pupils and teachers; and local school cultures and environs" (p. 319). School environments have the potential to integrate and propagate multiple reflections of diversity in a bi-directional relationship where "the child [and their community] impacts the environment and in turn is impacted by the environment" (Robson & Mastrangelo, 2017, p. 5).

The philosophical appeal of the "third teacher" is supported by empirical studies, but these studies are limited, especially when it comes to the effectiveness of the third teacher. One recent study, the 2017 Holistic Evidence and Design Study (HEAD) of UK primary schools, investigated how the physical design of classrooms impacts the learning progress of students aged 5 to 11 years in math, reading, and writing (Barrett, Davies, Zhang, & Barrett, 2017). The research extended to include 27 schools, 153 classrooms, and 3,766 students in Britain. 18% of these students were identified as having special education needs (SEN). Figure 2 presents the authors' schema, which emphasizes the influence of the third teacher on student learning. Interestingly, the learner is not depicted in an interactive relationship as conceived by Reggio Emilia, but in a reactive one. Regardless, "for each of the different subject models, the aspects of the classroom environment taken together explained approximately 10% of the variability in the pupil performance" (Barrett, Davies, Zhang, & Barrett, 2017, p. 445). While the authors acknowledge that their study was unable to assess how teachers and pedagogy impacted learning, the evidence that they collected is enough to give those teachers, school administrators, and

government officials pause for thought especially when it comes to making decisions around creating optimal learning spaces for their diverse learners.

Figure 2: Overview of HEAD research design (with examples of BE factors).



(Barrett, Davies, Zhang, & Barrett, 2017, p.446)

The Organization for Economic Co-operation and Development "has consistently emphasized the need to align our architecting and building of schools and educational spaces coherently and reciprocally with our developing and evolving understanding of pedagogy, teaching, and assessment" (cited in Hall, 2017, p. 319). British Columbia's new curriculum redesign aims to "refine our education system, designed in the last century, so students can succeed in the 21st century" (BC Ministry of Education, 2018, p. 3). This renovated and updated curriculum is inclusive and responsive to individual learners' variant needs, but a fundamental question remains unanswered: how will the values of the new curriculum be adequately expressed through the design, organization, and layout of physical learning environments (Nordquist & Laing, 2014, p. 555)? Nordquist and Laing (2014) use the analogy of incompatible

software to frame this problem: the new curriculum with its inclusive, individualized vision of learning is the flashy new software that will achieve our needs. However, it cannot run properly on our old, outdated hardware. Our school and classroom landscapes were designed for a different type of learning. This begs the question: what will it take for our physical spaces to be compatible with the new curriculum such that we can successfully run what promises to be a more inclusive system of education?

Designing for Dis/ability

To explore and identify building design considerations for inclusive schools, I surveyed articles from the field of Architecture and Design. Through this review it became clear that there is a growing interest in designing spaces and places that mesh with the heterogeneous nature of humanity. In the realm of disability, design parameters are widening beyond accommodations for those with visible disabilities, like wheelchair users and the blind, to include design specifications for those with invisible disabilities, like autism and sensory processing disorders. Sensory experiences with lighting, acoustics, air qualities, aesthetics, furniture, and space naturally differ from person to person, but for individuals with impairments that affect the senses, these phenomena can be either painfully disabling or irresistibly welcoming depending on how they are composed.

Architects create accessible physical environments with wheelchair users in mind because these individuals represent an extreme in mobility challenges. A wheelchair user would be completely disabled by a flight of stairs, so this design element must be strategically replaced or supported by elevators, ramps, and curb cuts. The end result is that these design features enable people with an array of mobility issues. Similarly, recent literature about accessible design is increasingly oriented around the Autism Spectrum Disorder (ASD) because individuals

with this condition, depending on the severity, can be the ultimate test when it comes to sensory challenges (Sanchez, Vazquez, & Serrano, 2011). It is hoped and expected that designs focused on this group's needs will also benefit people with sensory processing difficulties or sensory sensitivities. For example, individuals with Attention Deficit Hyperactivity Disorder, Concussive Disorder, Post-Traumatic Stress Disorder, Fetal Alcohol Syndrome, or Learning Differences would all presumably benefit from designs that consider users' sensory experiences (Dalton, 2016).

Mostafa (2014), a Canadian professor working in the Department of Architecture at The American University in Cairo, is a lead scholar in an emerging field of study around designing inclusive mainstream schools for students on the autism spectrum. Up until recently, ASD has been excluded from school design codes and guidelines. Yet ASD is not a rare disorder and its incidence is increasing at an alarming rate within the general population (Khare & Mullick, 2009). The Canadian Public Health Agency reports that 1 in 66 school aged children have ASD in the country. This fact, paired with convincing evidence that there is a correlation between the educational environment and ASD students' performance, has spurred on a new approach to school design.

Previously, architects followed a "neuro-typical" approach to design that proposed "the immersion of the autistic user in as typical and stimulating environment as possible in order to encourage adaptation to overstimulation so typical of the disorder and to replicate the level of stimulation found in the real world" (Mostafa, 2014, p. 3). While it is important for students with invisible disabilities to learn how to self-regulate and socially integrate into the mainstream, the concept of what constitutes reality is value-laden and highly individual. The very idea of fitting into another person's reality is uncomfortable and suggests conformity. Issa (2017) states: "as

architects have been entrusted by society to provide the environments that allow the inclusion of all its members in its social life, they have a duty to facilitate mainstreaming persons with special needs as well as the developmentally disabled, as the ones on the autism spectrum disorder (p. 2). To fulfill this obligation, Mostafa (2014) calls for a sensory design model "which stipulates that favorably altering the sensory environment can be conducive to positive and constructive autistic behavior, particularly in learning environments" (p. 3).

Mostafa's (2014) model, ASPECTSS™ is designed for autism in particular, but addresses individual design elements that may positively impact all students' experience in the built learning environment. Mostafa (2014), Woolner, Hall, Higgins, McCaughey, and Wall (2007), identify acoustics as an important design consideration for all students because of its impact on mood and cognitive functioning. However, while the average student may be annoyed by noise and work less efficiently, a student on the spectrum can be enraged or enamored by sounds to the point of being unable to learn or engage with their peers. McAllister and Sloan (2016) interviewed students with ASD about learning environments and they consistently identified noise as their major concern. Some solutions for students with ASD include "Snoezelen" rooms (a controlled multisensory room) and other withdrawal or "escape" spaces where sound can be modulated or minimized (Khare & Mullick, 2009; Mostafa, 2014). Woolner, Hall, Higgins, McCaughey, and Wall (2007) identify standard sound-dampening measures such as sound systems, carpeting, panels, and ceiling hangings. They also point out the challenge inherent in designing the optimal learning environment; solving the sound issue using textured, fabric surfaces negatively impact another key design element, air quality, because allergens like dust and pollen adhere to these surfaces and in turn, affect the users' health and well-being.

Architects have always put considerable thought into the arrangement of spaces or rooms and the pathways that lead to them. When students with ASD in Northern Ireland were interviewed about their ideal mainstream high school, they indicated that it should be safe, predictable, include a choice of outdoor play spaces, always provide direct access to the outside, and allow for good circulation within interior corridors leading to rooms, entries, and exits. Mostafa (2014) echoes their sentiments specifying that school designs should consider:

- "sensory zoning": the arrangement of high and low stimulus areas;
- "spatial sequencing": the flow from one space to another; and
- "transition zones": buffer spaces that allow for "sensory recalibration".

Mostafa (2014) envisions these learning spaces connected by nodes orbiting a central junction, creating the flexible space needed to accommodate not only a variety of learners, but a range of activities.

Design aesthetics and lighting combined with appropriate signage can be used to effectively delineate school spaces and to reflect their purpose while at the same time, controlling the amount of stimulus for students with sensory issues (Issa, 2017; Mostafa, 2014). Signage should always pair written text with a visual to guide not only students with ASD but anyone who does not know how to read written English. Visual aids such as colour, different building materials, and pattern can be employed in circulation areas like entrances, exits, foyers, and hallways to assist wayfinding, which is a challenge for students with ASD and other proprioceptive challenges (Mostafa, 2014). Researchers warn against the use of intense primary colours, because they are overstimulating, and instead suggest using subtler, more calming colours in school designs (Hall, Higgins, McCaughey, Wall, & Woolner, 2007). Similarly, lighting should be primarily natural and supplemented by electric, full spectrum lighting that is

glare- and flicker-free; ruling out most of the economical fluorescent lighting that is used in schools today (Hall, Higgins, McCaughey, Wall, & Woolner, 2007; Mostafa, 2014). Mostafa (2014) suggests that subtle changes in lighting from one space to another could be used to calm the senses as well as to help students transition between activities, which can be a challenge for many students but especially those with ASD.

A school that includes design elements aimed at students with invisible sensory disabilities is a safe and welcoming place. Safety was a recurring theme for the high school students with ASD that McAllister and Sloan (2016) interviewed for their study. McAllister (2012) observed that "if [students with ASD] are ill at ease in their surroundings, pupils with ASD are disadvantaged by being distanced from the learning that they so badly need" (p. 201). Students need to be included at every level of learning and their voices should inform the very foundation of the building where the learning takes place.

Co-constructing Inclusive Schools

Individuals with disabilities were formerly not considered, let alone consulted, in the school design process. Today, the literature increasingly reflects appreciation for collaborative design ventures, especially in the realm of school architecture (Jones, 2014). However, this consultative and participatory design process becomes complicated when the people you are working with have social language and communication challenges. Fortunately, recent literature offers ways to facilitate inclusive design that is informed by all voices especially those who were previously unable to articulate and express themselves in conventional ways (McAllister & Maguire, 2012).

The United Nations Convention on the Rights of the Child reinforces that children should have a say in the decisions that adults make that impact them (UN, 1989). "Students are active

members of the intellectual community and should be invited to contribute to the development of their educational environment" (Köning & McKenney, 2017, p. 248). Children's input helps school design projects overcome adult conservatism and gives them ownership over the space; "there is an implication in many studies that the empowering process of re-designing and taking ownership could spill over into motivation and empowerment in other areas, encouraging creativity and experimentation in curriculum, raising motivation toward s academic and social goals" (Hall, Higgins, McCaughey, Wall, & Woolner, 2007, p. 63). McAllister and Sloan (2016) argue that students who take in the world differently from the norm have a valuable and unique perspective to share; "those who have sensory difficulties, in effect, by default have a 'critical eye' and may be well placed to speak for many others who have not been diagnosed with similar sensitivities or others who find the built environment difficult to tolerate or navigate" (McAllister & Sloan, 2016, p. 332). Yet despite these advantages, it is all-too-common for architects and school bureaucrats not to pursue user involvement in design projects.

The transdisciplinary nature of participatory design is both its challenge and its strength; makers of the built school environment – architects, engineers, and construction specialists – communicate using technical language that is most likely unfamiliar to users – students, parents, specialist teachers, administrators, clerical workers, custodians, occupational therapists, physiotherapists, counsellors, social workers, and user groups (Koutemanis, Heuer, & Könings, 2017). In the standard approach to school design, stakeholders submit design specifications to architects and engineers based on budgets, location, and population. The experts then take these design specifications and translate them into a vision of their own based on established building parameters, but often without having any real understanding of the human beings who will ultimately utilize their design. As soon as teachers, students, and other users enter the new

school, the miscommunications and missed communication quickly become self-evident. The pile of books against the wall speaks to inadequate storage and the washroom line-up clarifies the toilet shortage. Yet the human element is subtle and complex. A child with ASD rocking in a chair, frantically vocalizing could be a testament to the lack of alternative settings, the intensity of the lighting, the poor acoustics in the room, the stressful journey to the classroom, or the smell of the new school itself. Without shared language, how do you express a need or even a want and how do express when it is not being met?

McAllister and Maguire (2012), who work in the architecture department at Queen's University Belfast, recognized the communication gap inherent in the initial stages of the design process; "what might appear straightforward and simple is complicated by the difference in language between client and architect" (McAllister & Maguire, 2012, p. 203). McAllister and Maguire (2012) created an "ASD Classroom Design Kit" to help bridge this gap. The kit is a scaled down, 3D mock-up of a classroom complete with movable walls, ceilings, fixtures, and furniture. The kit is designed to be used by special education teachers to specify the design parameters for small group, ASD intervention classrooms. The teachers manipulate the design elements and discuss their choices and their rationale with one architect while another records the specifications. Following this interview, the designs elements are arranged using 3D Computer Aided Design (CAD) so that the teachers can review and edit their design by taking a virtual walk through it with the architects. Heuer, Könings, and Koutamanis (2017), also advocate using collaborative Building Information Modelling software (BIM) suggesting that a "shared model forms a stable basis that makes evident conflicts and lacunae, facilitates process management and interaction, and prevents design failures that may become apparent too late" (Heuer, Könings, & Koutamanis 2017). The next logical step for researchers at Queens

University was to investigate how to include the other users, students with ASD, in the conversation.

Communication challenges between design professionals and students with ASD would be further compounded by the social language delays associated with the disorder. To aid in the participatory process, researchers developed another visual aid design tool; "believing that physical models are a more common ground and 'shared tongue' between language of drawing (favoured by the designer) and the spoken word (preferred by the non-designer), a simple 'jigsaw kit-of-parts' was developed by the authors to be used by pupils with ASD in order (hopefully) to communicate their ideas and feelings about what would constitute, to them, an autism friendly [school]" (McAllister & Sloan, p. 334, 2017). Students in this study attended four workshop sessions to view a visual presentation on architecture and how "The Jigsaw Kit of Parts" related to this field. Then they were invited to work with "The Jigsaw Kit of Parts" to create what they considered to be an ideal, small, single-story, inclusive secondary school. "The pupils who took part in the workshops felt a sense of value and pride when given the opportunity to put forward their ideas for school design" (McAllister & Sloan, 2017, p. 347).

Participatory design often focuses only on the initial stage of the process. Woolner, Hall, Higgins, McCaughley, and Wall (2007) attribute this to architectural determinism, the concept that "human beings tend to resort to simply coping with the given environment rather than actively managing it" (p. 54). Some participatory design scholars question whether classrooms and schools are sustainable without continual user input throughout their lifecycle (Heuer, Könings, & Koutamanis, 2017; Könings, Seidel, Jeroen, Merriënboer, 2014). According to Heuer, Könings, and Koutamanis (2017), the school lifecycle includes four stages that should be informed and shaped by user-feedback: the intiative, development, realization, and operation

stages. The operation stage, where "the finished school is being occupied by teachers and students who deploy their teaching and learning in it" (Heuer, Könings, & Koutamanis, 2017, p. 297), is perhaps the most neglected stages in participatory design. As the school ages, user input is needed to adjust the building's design elements to accommodate and enable not only curriculum innovations, but the ever-changing dynamic of the students and staff using it.

Projecting Forward

As I worked my way through the literature, I reflected on my own school district, Sooke. I wondered about the processes that had been followed to retrofit old schools and to design new schools like Belmont and Royal Bay Secondary. What lessons did they learn through those processes? Would they approach future builds differently? Did they design with diversity in mind? I start to imagine what that design process could look like, with the new BC Applied Skills Curriculum in mind. Design thinking is a core competency in Applied Skills. I picture students using design thinking to inform the District's new builds. The students would learn about themselves and about the diverse needs in their student body to empathize with the future users. Inspired by the researchers at Queen's University Belfast, I envision a diverse group of students working with visual models, jigsaws, 3D representations, and computer software, to prototype their ideal school. This would address one of the "Big Ideas" in the Applied Skills Curriculum: the "designs can be improved by prototyping and testing" (BC Ministry of Education, 2018). But my proposal is not intended to be theoretical or imaginary. I propose that these children, empowered and engaged, would present their ideas to the architects and administrators charged with designing Sooke's planned new school at the Sunriver Location. My project is to enable this participatory design process.

Chapter 3: Designing with Diversity in Mind: Co-constructing Inclusively Built Schools

The literature supports a participatory school design process that is centred on and honours students' voices. However, convincing School District officials and teaching staff to facilitate this process will take more than citing research and pointing out best practices. The District's power brokers must first be convinced that an inclusive, collaborative school design process is worthwhile, and second that a participatory school design process directly aligns with the District's strategic plan and the provincial curriculum. Yet this top-down approach cannot be successful in enabling the creative and inspiring voices of the diverse student body unless the teachers, support staff, and students themselves are also believers. Thus, I propose a combination of top-down directive and grass-roots activism are necessary to implement such a program.

The Sooke School District #62: A Place for Growth

Unlike many of BC's shrinking school districts, Sooke School District (SSD) is growing quickly. Located on Southern Vancouver Island, the SSD encompasses six government entities: The City of Colwood, City of Langford, District of Highlands, District of Metchosin, District of Sooke, and the Juan de Fuca Electoral Area, which includes East Sooke and Port Renfrew (Sooke School District, 2018, p. 3). According to BC Statistic's population projections, the SSD's population will grow by 27% from 2017 to 2028. (Sooke School District, 2018, p. 8). This population boom can already be seen in the portables around most schools, including some newly built schools like Royal Bay Secondary School in Metchosin. Pressures are mounting to add further state-of-the-art new schools to serve these developing communities. The SSD's Long Range Facilities Plan 2018 Update anticipates that six new schools need to be built to keep up with this rigorous growth.

At the same time, existing buildings in the district are in need of repair as well as retrofitting to accommodate new technologies, curriculum, and visions of inclusion. Of 24 school buildings in the district, half are rated in good or excellent condition, six are adequate but require modernization, and another six are poor and in need of replacement. One-quarter of the District's schools are inadequate, but budgetary constraints prevent any sort of quick fix. Stop-gap measures in response include creatively repurposing spaces to serve the needs of an increasingly diverse student body. Closets are turned into computer labs; theatre stages become learning resource rooms. The answer to this crisis lies in long-term progressive planning: the "Sooke School District Strategic Plan 2018-2021" outlines collaborative and dynamic processes to accommodate this long-term growth, paving the way for future builds.

Under these circumstances, it is a certainty that new schools and retrofit projects are coming soon in SSD. Within this time-pressured and resource-constrained environment, I propose there is an opportunity for student participation in the school design process. Appendix A outlines a Powerpoint presentation that I have developed in order to make a case to District management for how the SSD's strategic plan and this collaborative design process interconnect. I suggest that this is a teachable moment and that now is the time to seize this opportunity. The basis for this presentation is outlined in the following section.

Paving the Way to Future Builds: The Sooke School District's Strategic Plan 2018-2021

The SSD's Strategic Plan has three key goals: "Learning", "Engagement", and "Growth". All three goals have objectives that strongly connect with a student participatory design model for building projects.

The SSD's "Growth" goal aim to accommodate growth and changing demographics by creating safe and respectful environments that inspire learning" (Sooke School District, 2016, p.

p. 14). The “Learning” goal calls for creating and supporting innovative teaching and learning environments (Sooke School District, 2016). Both of these are a natural fit for a student participatory design process for new schools. Though they do not speak directly to building design, these objectives affirm a commitment to developing programs of choice that are responsive to student and community input.

SSD’s “engagement” goal makes a commitment “to foster a collaborative and healthy environment through effective engagement and communication” (Sooke School District, 2016, p. 12). A participatory design model includes students as key advisors in the school design process. I argue there is no better way to enhance student engagement than by involving them in the very design of the environments where they will learn. Students would get a “greater sense of community through engagement with all stakeholders” and the SSD would receive valuable input to inform school building projects (Sooke School District, 2016, p. 12). Most important of all, from my perspective, this participation in the design process presents an opportunity to involve marginalized students, which in turn will help envision and realize safe, flexible, and culturally responsive environments that meet their needs and the needs of all (Sooke School District, 2016). Furthermore, combining this initiative with BC’s new applied skills curriculum, I see an irresistible opportunity to concrete these ideas into a cohesive action plan.

BCs Applied Design, Skills and Technologies (ADST) Curriculum

Talking about student participation in school design process is a nice first step, but it is an empty gesture unless it comes with actionable steps. I propose that BC’s Applied Design, Skills and Technologies (ADST) Curriculum offers scaffolding to bridge these participatory design ideas with curriculum (B.C. Ministry of Education, 2018). By focusing aspects this curriculum on building design, ADST would meet its goals to “[build] on students’ natural curiosity,

inventiveness, and desire to create and work in practical ways" (B.C. Ministry of Education, 2018). A broad spectrum of students from K to 12 could learn about building design, with a specific emphasis on accommodating the needs of all students and stakeholders. Students could share their school design ideas with district management and architects. These consultations would develop a sense of agency in students, a mutual respect between stakeholders in the district, and, perhaps best of all, I truly believe that a grass roots, boots-on-the-ground, community-based initiative will innovate design ideas that are beyond the imaginations of these adult experts in their distant offices.

Given plans for new and retrofitted elementary, middle, and secondary schools, my Powerpoint presentation in Appendix A outlines ADST connections from K to 12. My plan envisions lead teachers at various grade levels using curriculum as a springboard to creatively craft units of study around a new school design challenge. However, I recognize that many teachers appreciate having a tangible example to follow, so I created a sample unit of study for a Grade 5 classroom (Appendix B). I also fleshed out a lesson on "Understanding the Context" from the unit (Appendix C). These teaching materials showcase how the ADST curriculum can be used as a vehicle for a participatory school design process and, in doing so, also fulfil the goals of developing understanding and empathy for differently able students and diversity.

Inclusive Design Starts with Empathy

I assembled the Grade 5 School Design Challenge Unit with my students in mind: a diverse group of kids with a range of particular strengths and unique challenges. I thought about how their school, built in 1994, worked for and against them, as students learning in the 21st century. I reflected back to where I started with this paper, thinking about what disability means, how it is defined, how it is perceived, and, ultimately, what can alleviate it. I also reflect back to

my feelings of empathy for differently able people, flowing from my own lived curriculum, all the people who have informed who I am and how I see the world. Those former students, disabled and not, who have worked their way into my thinking when I design lessons, I design for all of them. It is with all these exceptional personalities swirling around my head that I realize that this is the missing piece in my proposal. This plan is entirely drawn from my experiences with those exceptional kids who have taught me so much throughout my career. By sharing these student personas (Appendix D) with teachers and with my students, I hope to respect and reflect the discussions, revelations, creative solutions, and school design ideas that I anticipate these personas will generate (DesignLab, 2017).

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Appendix A: A Participatory School Design Process for the Sooke School District

Slide 1

Slide Notes:

While this opening slide targets the Sooke School District, any district in the province could adopt an inclusive school design process.

Speaker Notes:

The BC Curriculum promises that "every student will get hands-on experience in collaboration, critical thinking, and communications - skills they'll need to succeed in college, university, and the workforce" (BC Curriculum Page 1, Para 4). Participating in the design of a new school or the re-design of an older school is the perfect opportunity for that experiential learning. At the center of the design experience is empathy, walking in someone else's shoes to think about each other and our different perception of what's around us. Through empathetic thinking, students may achieve the powerful realization that not everyone walks, or moves, or sees, or hears, or feels in a standard way and that we are so beautifully different within our shared learning environment. Students participating in school design has a direct benefit in building skills for success in the workforce, but also helps students become more compassionate human beings who appreciate and value diversity.

Slide 2

Slide Notes:

This slide defines what Participatory School Design is by distinguishing how it differs from a more traditional approach to school design.

Speaker Notes:

Traditionally, participation has been limited to the paying client, management, and contracted design professionals whose expertise was relied upon to determine the final design concept. Traditional school design is adult-centric. With participatory school design, the consultation process is open to members of the wider learning community including stakeholders like students, teachers, parents, and outside user groups. Of all the stakeholders, students are given a pivotal, hands-on role in the design process.

Slide 3

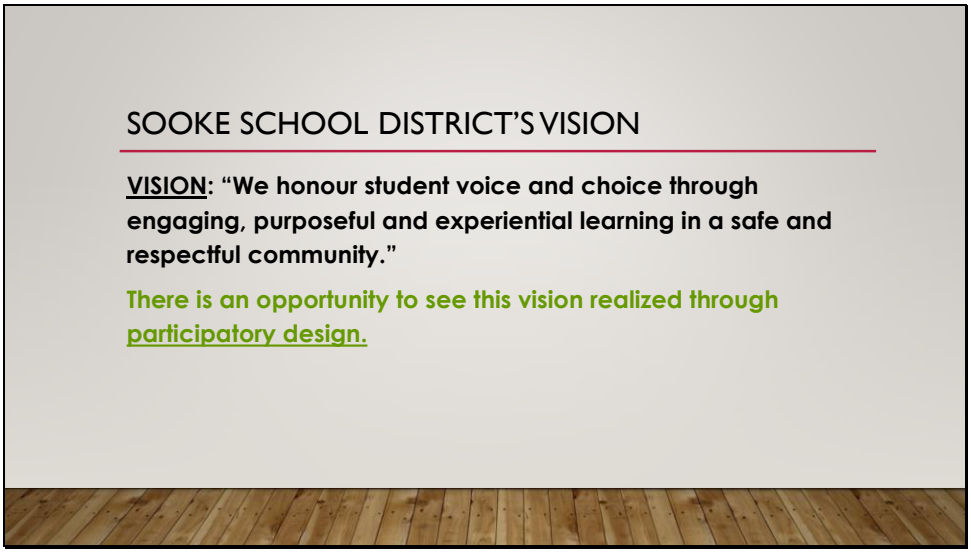
Slide Notes:

While this slide is directed at a participatory school design process for Sooke Schools, any district could be substituted here. No matter the school district, the vision, mission, values, goals, and future plans orbit around students, so this would be a natural fit with a participatory school design process.

Speaker Notes:

A participatory school design process fits with the Sooke School District's vision, values, goals, and strategic plan because the District has made a clear commitment to honouring student voice and choice**.**

Slide 4



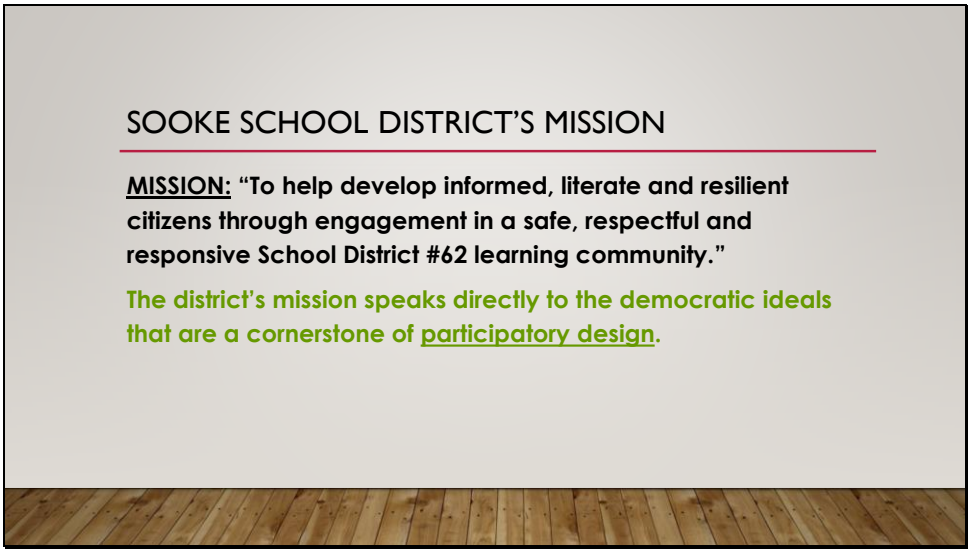
Slide Notes:

This slide connects the SSD's vision with a participatory design process.

Speaker Notes:

The SSD's vision aligns with a participatory school design process. Like SSD's vision, the process is driven by student voice and choice, and it would be centred on the real-world experience of planning and designing a new school.

Slide 5



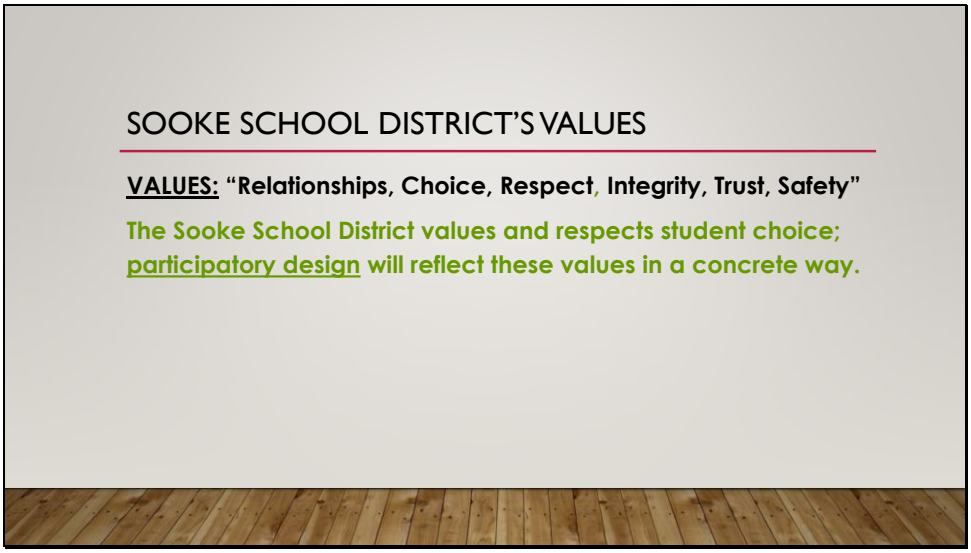
Slide Notes:

This slide connects SSD's mission statement with participatory design.

Speaker Notes:

Participatory school design embodies democratic ideals supported by SSD's mission statement. Students would get a first hand look into the steps that citizens and stakeholders need to take to bring a new school project to fruition. Consider Ravi Parmar, our own SSD trustee, who became an agent of change when he lobbied for a new Belmont after enduring the shortcomings of the old one. How many students might we engage in active lifelong citizenship, like Mr. Parmar, by using a participatory school design process?

Slide 6



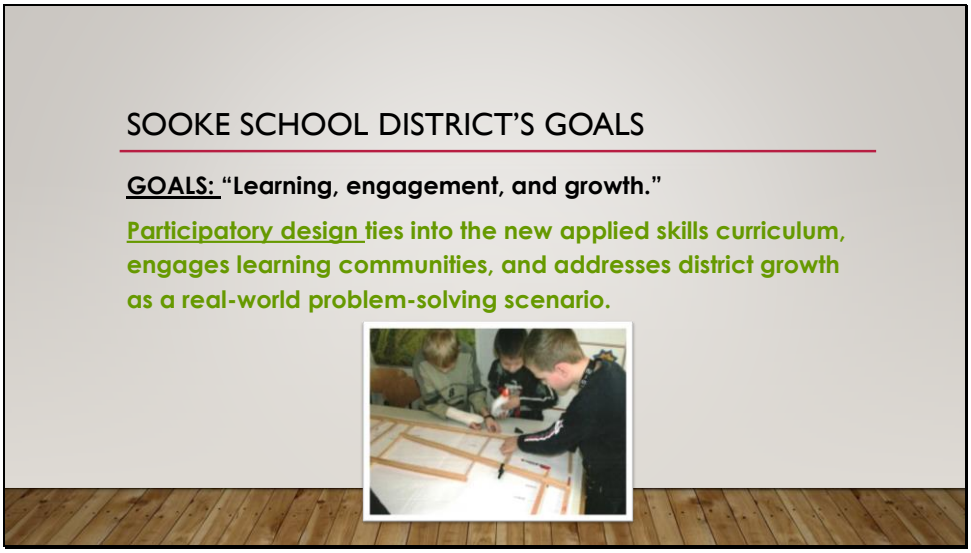
Slide Notes:

This slide connects SSD's values with a participatory school design process.

Speaker Notes:

A participatory school design process brings stakeholders together, builds relationships, honours choice, and shows respect for different ways of being and learning, in a safe and trusting collaborative environment.

Slide 7



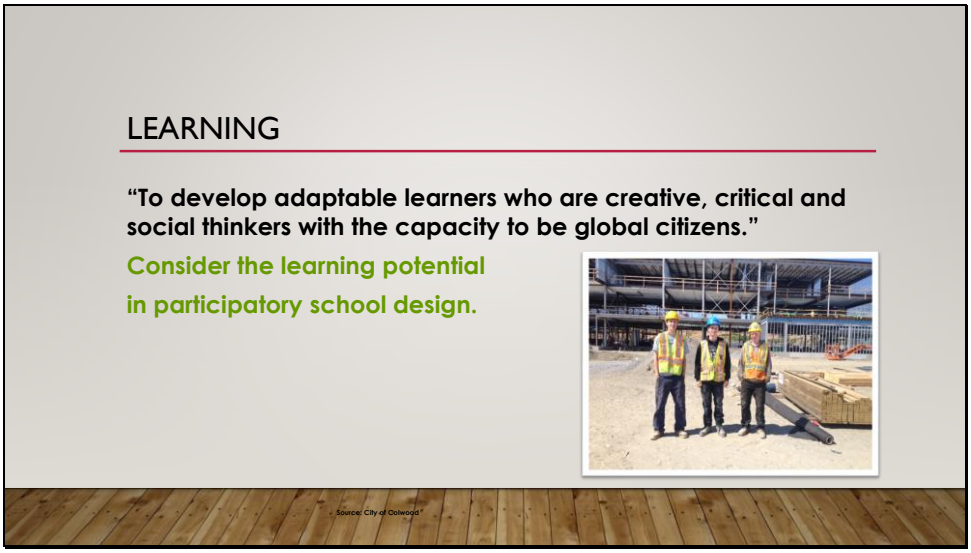
Slide Notes:

This slide connects a participatory school design process with SSD's goals, learning, engagement, and growth. These goals inform the district's "Strategic Plan 2018-2021".

Speaker Notes:

Perhaps most importantly, a participatory design process ties directly into the SSD's strategic plan and goals; the process would address the core competencies, tie directly into the new applied skills curriculum, engage learning communities, and address district growth as a real-world problem-solving scenario.

Slide 8



Slide Notes:

This slide connects SSD's learning goal and its objectives with a participatory school design process. Objectives that are directly linked are highlighted in green.

Speaker Notes:

A participatory school design process would harmonize with SSD's "Learning" goal. The process would give all students a direct hand in shaping their learning environment and provide previously marginalized students with a platform to voice their needs. Consider how powerful this could be for students who need adaptations to their environment to be able to learn, such as students with autism, ADHD, sensory processing disorders, or mental illness. Think of a student who has autism consulting with designers and architects to adjust lighting, acoustics, and learning spaces so that they are enabled to learn from the first day the school opens its doors.

Slide 9

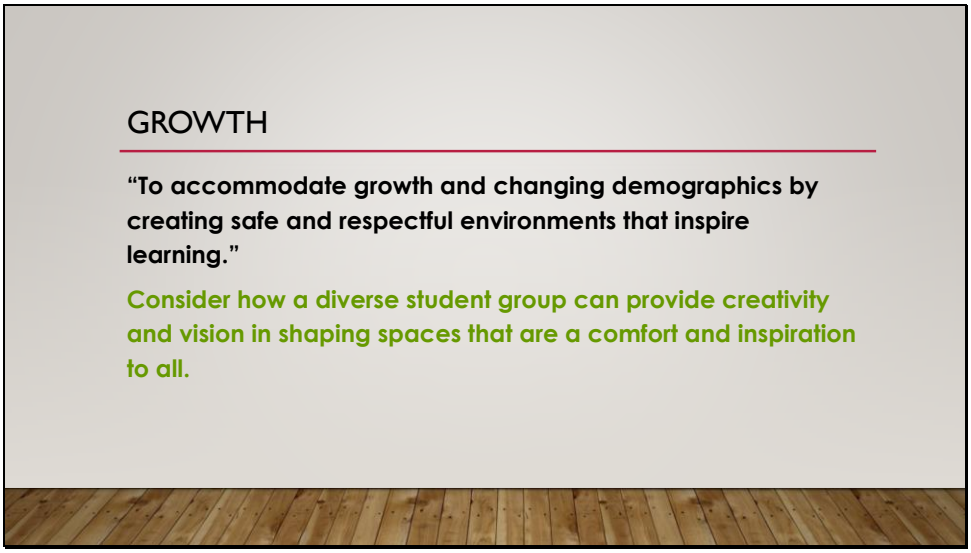
Slide Notes:

This slide connects the participatory school design process with the SSD's "Engagement" goal. Objectives that are directly tied to the process are highlighted in green.

Speaker Notes:

A participatory school design process is collaborative by nature and if all students are brought into the conversation, the resulting design will be healthy and enabling, echoing the voices that joined together to make it happen.

Slide 10



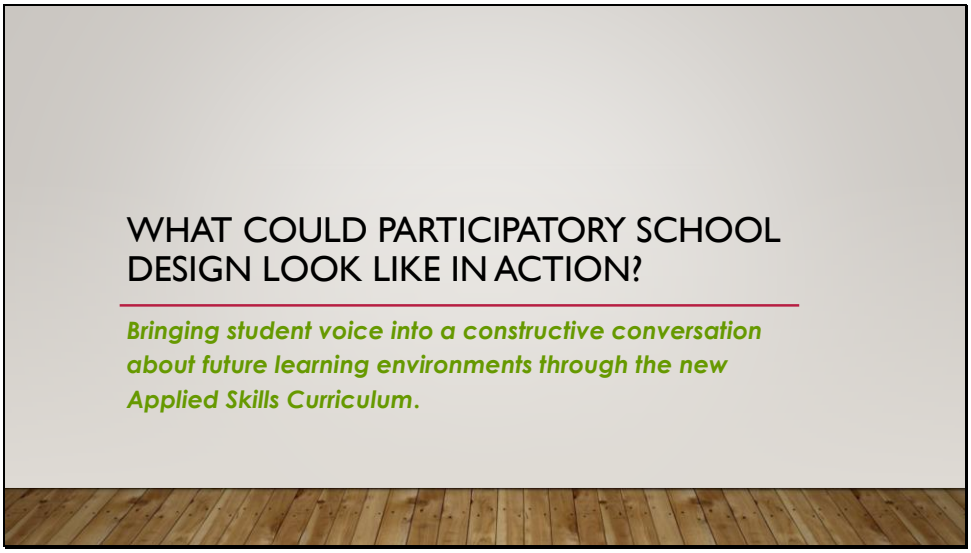
Slide Notes:

This slide connects SSD's "Growth" goal with a participatory school design process. The intent of the goal is highlighted in green to demonstrate that it aligns with the process.

Speaker Notes:

A participatory design process would create those safe and respectful environments that inspire learning because they would be built on the creativity and vision of the diverse array of students who populate them.

Slide 11



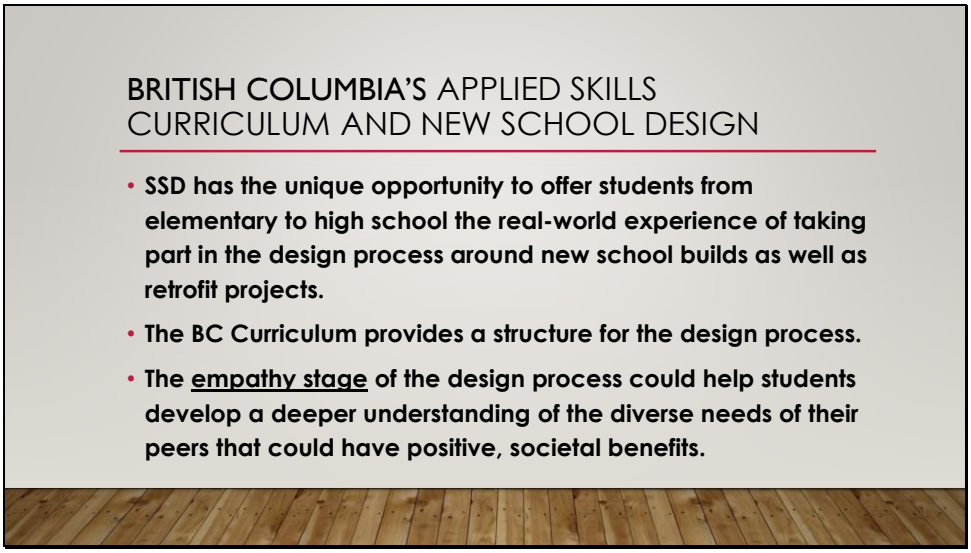
Slide Notes:

This slide shifts the presentation into looking at what the participatory design process could look like in the SSD. A question is used to frame the presentation as an inquiry. The following slides are suggestions and possibilities to spark further discussion and creative ideas.

Speaker Notes:

So, what could participatory design look like in Sooke District Schools moving forward?

Slide 12



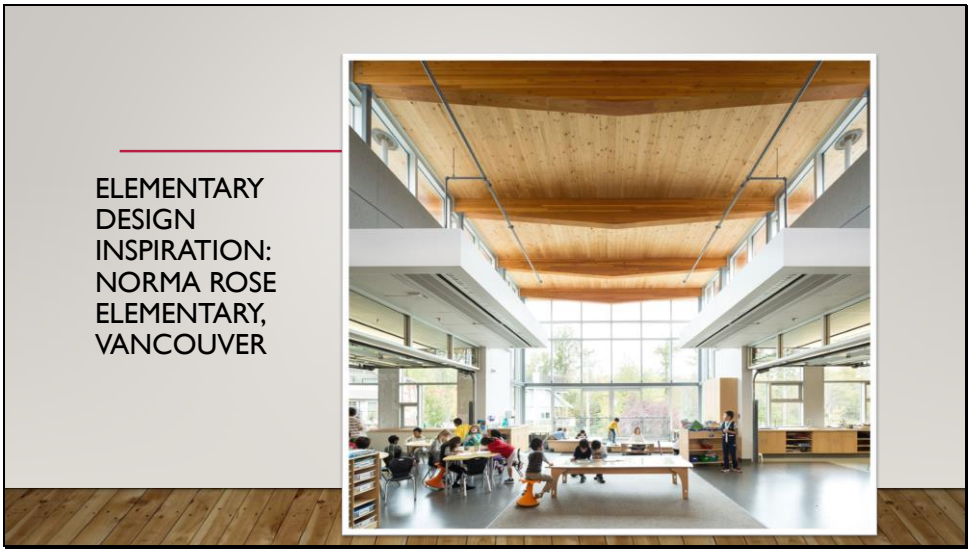
Slide Notes:

This slide connects the participatory school design process with BC's new curriculum. While the slide focuses on the ADST curriculum, there are other cross-curricular possibilities to consider.

Speaker Notes:

A participatory school design process could be channeled through BC's New Curriculum. Applied Design Skills and Technology is a logical starting point because it is centred around the core curricular competency of applied design. However, there are multiple cross-curricular avenues for students to critically think about and create a plan for a new school. Of course, the content and the approach would have to be age-appropriate to be meaningful and effective.

Slide 13



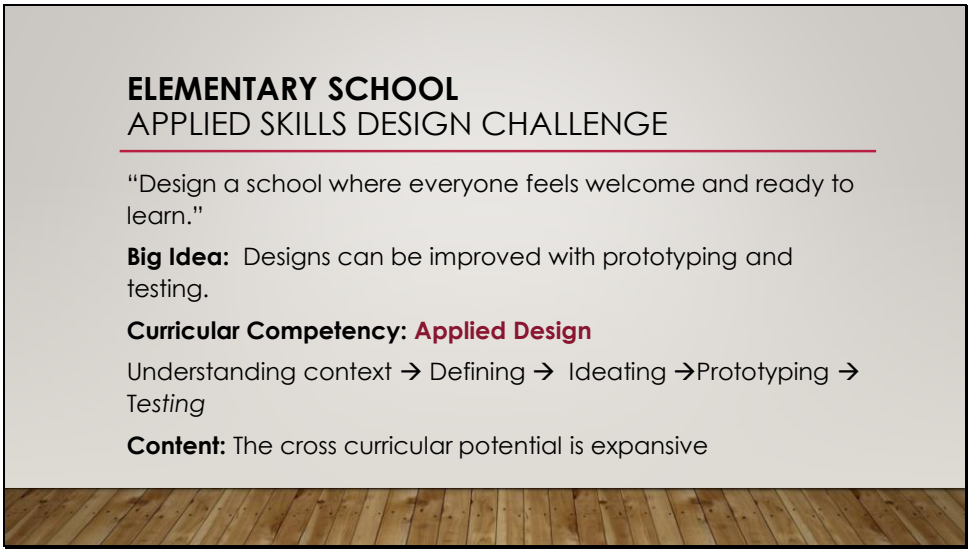
Slide Notes:

Norma Rose Elementary was designed by ThinkSpace, who was also contracted to build SSD's Belmont Secondary. The school is considered a model 21st Century Learning Environment.

Speaker Notes:

How might the collaborative design process look like for elementary or middle school students? It could start with an inquiry question like: What makes a school welcoming and a place that allows everyone to learn in a way that they learn best? Imagine students looking at designs like Norma Rose Elementary, selecting aspects that appeal to them and ones that don't. Picture a diverse group of students exploring examples of elementary schools around the world. Perhaps they would find images of one room schools with dirt floors, rooms without electricity or running water, or schools that exclude girls or students with disabilities; think about how this would shape their perspective. Perhaps they would find images of Finnish schools with cutting edge technology and innovative spaces that would excite their own imagination. This inquiry could have them re-examine and appreciate their own learning environment.

Slide 14



Slide Notes:

This slide identifies which ADST skills, knowledge, and understandings would be satisfied through a participatory school design process.

Speaker Notes:

A School Design Challenge could follow the ADST curriculum and culminate in students sharing their school design ideas with each other, district officials, and design professionals. So that teachers have a reference to follow, I used the BC curriculum to create a Grade 5 School Design Challenge unit overview along with an example lesson (Appendix B; Appendix C; Appendix D).

Slide 15

Slide Notes:

This slide shows how the middle school years' ADST curriculum could support and give structure to a participatory school design process in SSD.

Speaker Notes:

At the middle school level, more complexity could be built into the design question: "How can a school's design recognize and respond to diverse ways of learning and being?" This question could generate conversations around accessibility, gender, and cultural identity, as well as lead to other questions to explore. A subsequent design challenge to build an inclusive school might reflect the outcomes of these discussions and investigations. Think how valuable that input would be for the officials and professionals compiling data to inform a new school build.

Slide 16

Slide Notes:

The district's most recent experience with a school design process has been at the secondary level, for Belmont and Royal Bay. The schools were designed by different architecture firms, but both companies are dedicated to following a thorough consultative process. This slide honours that process.

Speaker Notes:

At the secondary level, inspiration abounds. The SSD's Belmont and Royal Bay Secondary Schools are state of the art, innovative learning spaces that are a testament to the thought and consideration that went into their design. Here is an image of Belmont which shows its ample use of natural lighting.

Slide 17

Slide Notes:

This slide acknowledges another successful new school build, Royal Bay Secondary. It is important to recognize and appreciate the creative work that went into these new schools before suggesting the addition of another layer to that process.

Speaker Notes:

And here is an interior shot of Royal Bay Secondary showing the flexible learning spaces. There is a lot of local inspiration for high school students to consider in a new school design challenge.

Slide 18

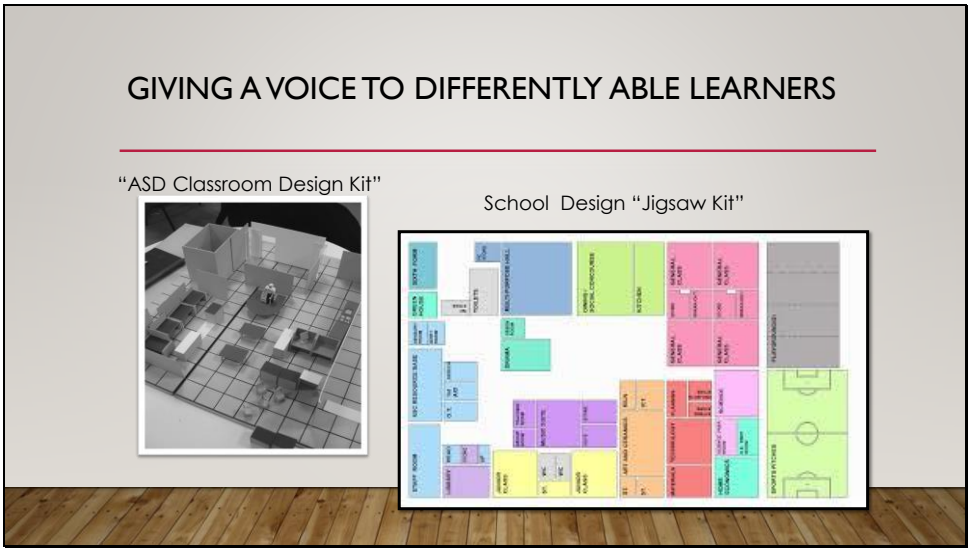
Slide Notes:

This slide invites SSD to consider another layer to that consultation process, a student-centric one.

Speaker Notes:

And what if students had the opportunity engage in research and critical observation in order to understand school design opportunities? This investigation could have cross-curricular connections. From obvious fits like visual arts, drafting, woodwork, and metalwork, to broader-based studies like History, Indigenous Studies, and STEM challenges, students could follow the steps in applied design to share their vision of a new and truly inclusive school. Consider a broad base of learners coming together to consult with industry professionals and other stakeholders in a meaningful collaboration to shape their future learning environment. Now imagine the ripple effects beyond that space, the confidence in their agency as citizens, the empathy for different ways of being, the inspiration for future paths.

Slide 19



Slide Notes:

This slide focuses on the research out of Queen's University Belfast around engaging ASD students in the school design process. This is cutting edge research and it is important to share with school leadership who may not have a background in special education.

Speaker Notes:

While students who are capable, confident leaders take every opportunity to voice their needs, students with lagging communication skills are often silent and missing from any school-wide initiatives by default. Consider what is lost from their absence. How might those unique perspectives shape and enrich a design for a new inclusive school? What if those students were purposefully approached for their ideas and input? Beyond the great ideas arising, think of what that collaboration would communicate to those students about their value to the wider school community. This empowering idea of designing with students who have special needs is the focus of recent research in the field of architecture. The School of Natural and Built Environments at Queen's University Belfast created the "ASD Classroom Design Kit" and the "School Jigsaw" to allow students with Autism to communicate their needs to architects drafting new school designs. Could we create that kind of opportunity in SSD?

Slide 20

Slide Notes:

This final slide ends with a visual and an invitation to think further about how a participatory school design process could be realized and tested out in the SSD.

Speaker Notes:

I invite you to think about the possibility of a participatory design process for the SSD, a growing district dedicated to engaging students in meaningful learning opportunities like this one.

Appendix B: ADST 5: An Inclusive School Design Challenge

Applied Skills 5

Design Challenge:
"Design a school where everyone feels welcome and able to learn."

Big Idea:
Designs can be improved with prototyping and testing.

Curricular Competencies:
Students are expected to be able to do the following (Applied Design):

Understanding *context*
- ➔ Gather information about or from potential students.

Defining
- ➔ Identify key features or user requirements for a school

Ideating
- ➔ Generate potential ideas and add to others' ideas
- ➔ Screen ideas against the objective, designing an inclusive school, and constraints
- ➔ Choose design elements and formulate an idea about an inclusive school

Prototyping
- ➔ Outline a general plan for the grounds, classrooms, and shared learning spaces in an inclusive school
- ➔ Record iterations of prototyping

Testing
- ➔ Gather peer feedback and inspiration

Making
- ➔ Construct the final product, incorporating planned changes

Sharing
- ➔ Decide how to share ideas
- ➔ Describe their process
- ➔ Determine whether the school serves individual, community, and environmental needs
- ➔ Reflect on their design thinking and processes, and their ability to work effectively both as individuals and collaboratively as a group, including their ability to share and maintain a cooperative work space
- ➔ Identify new design issues

Cross-Curricular Connections:

Math 5

- ➔ Model mathematics in contextualized experiences
- ➔ Visualize to explore mathematical concepts
- ➔ Area Measurement

Language Arts 5

- ➔ Exploring stories and other texts helps us understand ourselves and make connections to others
- ➔ Synthesize ideas from a variety of sources to build understanding
- ➔ Use personal experience and knowledge to connect to text and develop an understanding of self, community, and world
- ➔ Exchange ideas and perspectives to build shared understanding
- ➔ Use writing and design processes to plan, develop, and create texts for a variety of purposes and audiences
- ➔ Perspective/ point of view

Science 5

- ➔ Contribute to care of self, others, and community through personal or collaborative approaches
- ➔ Co-operatively design projects
- ➔ Generate and introduce new or refined ideas when problem solving
- ➔ Communicate ideas, explanations, and processes in a variety of ways
- ➔ Express and reflect on personal, shared, and other's experiences of place
- ➔ Local types of earth materials
- ➔ First Peoples' knowledge of sustainable practices

Social Studies 5

- ➔ Use Social Studies inquiry processes and skills to—ask questions, gather, interpret, and analyze ideas, and communicate findings and decisions
- ➔ Develop a plan of action to address a selected problem or issue
- ➔ Take stakeholders' perspectives on issues, developments or events by making inferences about their beliefs, values, and motivations (perspective)
- ➔ Human rights and responses to discrimination in Canadian society

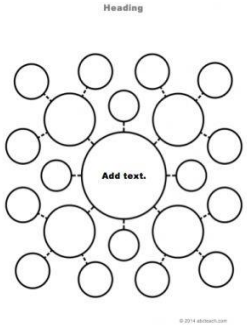
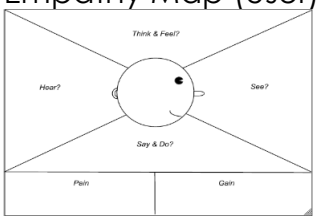
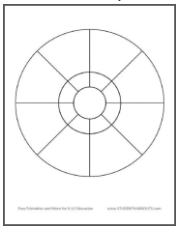
Career 5

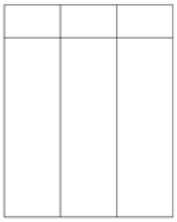
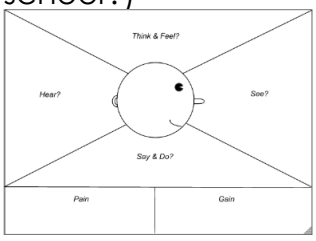
- ➔ Leadership requires listening to and respecting the ideas of others
- ➔ Demonstrate respect for differences in the classroom
- ➔ Use innovative thinking when solving problems

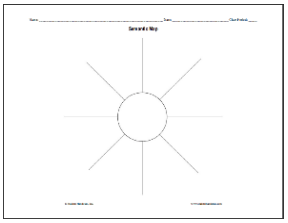
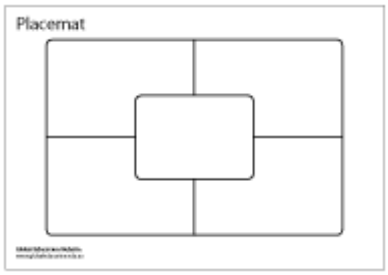
Arts Education 5

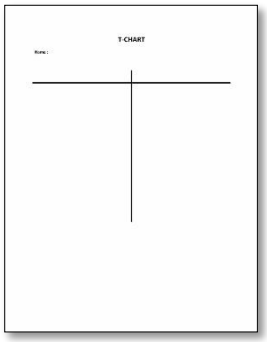
- ➔ Engaging in creative expression and experiences expands people's sense of identity and belonging
- ➔ Examine relationships between the arts and the wider world

School Design Challenge Overview

Design Stages:	Lesson Descriptions:	Resources/Materials:
Understanding the Context:	**Who uses our school?** -Think, pair, share -Students brainstorm -If we want to design a school for all students, we need to know our users to empathize with their needs: show video: What is Empathy? Mark Ruffalo and Sesame Street Teach About Empathy **Meet the School Personas (Appendix B)** -Jigsaw -Students investigate 6 fictional, student personas (2 typical; 4 exceptional students) -The "experts" on those personas assemble to record what they learn in the centre of an Empathy Map. -The "experts" then return to their original group to share out **Diverse Users** -Students complete an empathy map with themselves as the user -Guide students to complete concentric circle diagram. -Question: How can designers empathize with so many different users?	Web Graphic Organizer (Brainstorm Users)  From: www.abcteach.com Student Personas  From: www.storyboardthat.com Empathy Map (User)  From: www.solutionsiq.com Concentric Circles Diagram (Self; 6 personas plus 2 Classmates; Classes; Community) 
Understanding the Context:	**Surveying/Interviewing**	Online Survey Generators:

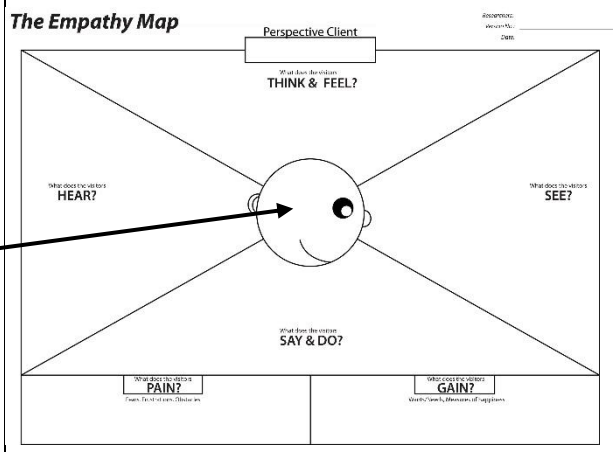
	Students (Users) -Students explore ways to survey and collect information/data about other students -Respectful questioning would be an important component of this lesson	▪ Surveymonkey ▪ Google Forms
Defining:	**What are the key design features of a school?** -Web Quest -Define: building design features for students -Students generate a list/collage of building design features in their own classroom, school interior, and exterior -Students look at other schools and their features to add to the list **Pain ⟷ Gain/User Experiences** -Students return to the 6 personas and expert groupings to determine: -How do they experience their school environment? -What do they need/ want from their school environment? -What obstacles do those students face at school? -Students regroup and share-out	School Design Features: Graphic Organizer (classroom, interior, exterior)  From: www.familyeducation.com Google Docs Empathy Map Cont. (Pain/Gain; What do students say, do, think, sense, and feel at your school?) 
Defining:	**Design Challenge:** -Students unpack the design challenge: "***Design*** a ***school*** where	**Semantic Map Graphic Organizer:**

	everyone feels ***welcome*** and ***able to learn***" using a semantic map	 From: www.studenthandouts.com
Ideating	**Generate Ideas:** -Students work in groups, to brainstorm design ideas for a new school using images from the internet as inspiration -The groups screen their ideas: Does the design consider the students' gains/pains? Is the design welcoming? Is the design enabling?	Placemat for Group Idea Share:  From: www.globaleducation.edu.au
Prototyping	**Outlining the plan for your school:** -Students work in groups to outline their plan; students use pencil/paper sketches, collages, or online renderings to articulate their ideas	Digital Drafting Programs: ▪ Google Sketch-up ▪ Tinkercad ▪ Minecraft
Testing	**Gathering peer feedback and inspiration:** -Students share out their ideas using a Fishbowl Discussion Format: Groups present their ideas in the centre and students on the outer group write feedback and inspirations on post-it notes	Materials: ❖ Chart Paper ❖ Post-it notes ❖ Pencils

Making and Sharing	**Implementing Changes** -Students reflect on the feedback and inspiration from the Fishbowl Sessions -Students make appropriate changes to their design	T-Chart to Categorize Feedback:  From: https://templatearchive.com/t-chart-templates/
	Sharing Finalized School Design Ideas -Students share their designs digitally or face-to-face with district officials and design professionals	Possible Presentation Platforms include: ▪ Google Slides ▪ Prezi ▪ Emaze ▪ Glogster ▪ VoiceThread

Appendix C: Understanding Exceptionality Through Personas

Applied Skills 5 Design Challenge: "Design a school where everyone feels welcome and able to learn."	
Design Stage: Understanding the Context	
Lesson: Meet Some School Personas	
Curriculum Connections: Applied Skills 5 → Applied Design *Language Arts 5*→ Exploring stories and other texts helps us understand ourselves and make connections to others *Social Studies 5*→ Take other students' perspectives on by making inferences about their beliefs, values, and motivations *Career 5*→ Demonstrate respect for differences in the classroom	
Resources and Materials: - "Wheels" Youtube: https://youtu.be/pFuwUiHo-WI - "Autism Awareness for Elementary School Students" Youtube: https://youtu.be/0R6LW3czUml - 6 "School Persona" sheets (8x11) X the number of students/group - "Empathy Map" (11x17) X number of students	
Facilitator:	**Learners:**
Show: "Wheels" Direct: "How did these kids show empathy?" "What did they do to understand how their neighbor experiences the world?" (To support visual learners, write/project these instructions.)	View "Wheels" Share ideas in a class discussion
Introduce: "Today you will be meeting some fictional, school personas. These students are users who you need to know before you design a school. To empathize with their needs, you need to understand who they are and how they experience school."	Listen/view. Assemble in expert groups.

Jigsaw Grouping: Divide students into groups. Then, number off those groups asking like numbers to break away into "expert" groups. Distribute: 1 persona to each group. Direct: "Read the "Student Persona" description quietly to yourself. Highlight key words." (To support visual learners, write/project these instructions.)	See Appendix D Read the "Student Persona" sheet highlighting key words/ Use assistive technology to access a Google Doc version and use the ReadWrite Add-on to listen to, view and highlight the write up. Annotate text.
Direct: "Now, re-read the selection and imagine that you are this student. On the margins of the page, infer how this character would feel in the spaces and places at school." (To support visual learners, write/project these instructions.) Direct: "Share what you inferred with the other 'experts' at your table.	Share their inferences with each other.
Distribute: One empathy map per student. Direct: "This is an empathy map. It is a graphic organizer that helps us to understand our user, in the case of school design, the student. At the centre of the map is a face icon. This is where we summarize who the user is: their name and important identifiers. Fill this out for your persona. Leave the other sections for our next lesson.	 From: https://www2.gov.bc.ca/gov/content/governments/services-for-government/service-experience-digital-delivery/service-design/methods-and-tools/document-and-visualize/empathy-map
Jigsaw Grouping: Experts return to original group.	Original groups reassemble and share out their personas. Compare similarities and differences.

Direct: "Introduce your user to the group." Direct: "Now that you know a bit about these personas. Discuss: How are they similar? How are they different?" Direct: "Share your observations with the whole class. How are your users similar? How are they different?" Show: "Autism Awareness for Elementary School Students" Youtube: https://youtu.be/0R6LW3czUml Close: "Schools house a diverse group of users who can seem very different from each other, but just as these students, just as you can be very different from each other, you have a lot in common too. Next class we will use empathy to understand how our users feel about and perceive school. We will be looking for those differences and similarities to really get to know are users." Direct: Write one take-away on a post-it note and put it on the EXIT board.	Discuss how their personas are similar and how they are different. Share the personas' similarities and differences. View video. Post take-aways on the EXIT board.
Assessment: Observation – record discussions and post to Fresh Grade Design Binders Exit Slips – photograph exit slip and post to Fresh Grade	

Appendix D: Meet the School Personas Templates

<table>
<tr><td colspan="2">Student Persona for Empathy Mapping

PERSONA 1</td></tr>
<tr><td>Picture:
  </td><td>Background Information:

Age: 10 years
Persona 1:
lives within walking distance to the school.
lives with both parents (one is a Librarian at the local library; the other is an RCMP officer)
has two siblings
speaks English at home
Involved with student leadership
Plays competitive basketball</td></tr>
<tr><td>Pain (Barriers)
wears glasses for short-sightedness; sometimes he has difficulty seeing the board
cannot play basketball on the broken tarmac</td><td>Gain (Opportunities)
wants a better playground and outdoor sports facilities for students</td></tr>
</table>

Student Persona for Empathy Mapping

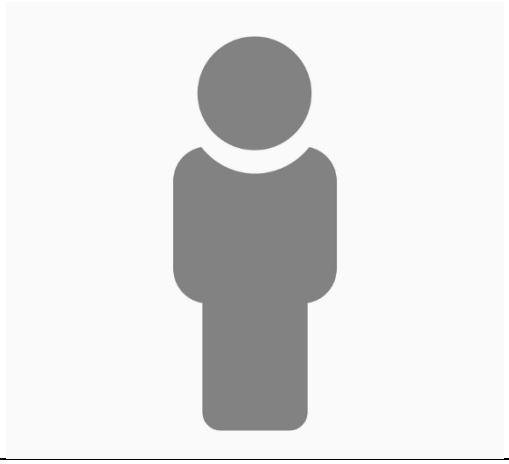
PERSONA 2

Picture:	Background Information:
	Age: 10 years Persona 2: • takes the bus to school • lives with one parent during the week and the other on the weekend (one parent works with the military; the other is a nurse) • an only child • speaks English • has ADHD and Dyslexia • artistic
Pain (Barriers) • cannot read some words on the signs/posters/displays at school • some classrooms have lights that make a buzzing noise that is distracting • the hallways are narrow and when persona 2 walks between classes with other students, this can be overwhelming • the teacher says that the classroom isn't set up for painting; this is frustrating for persona 2 who is a gifted painter	Gain (Opportunities) • wants to have video/multimedia displays at school • wants more natural lighting • wants wider passageways to classrooms • wants classrooms to be equipped for a variety of activities like painting

Student Persona for Empathy Mapping

PERSONA 3	
Picture: 	Background Information: Age: 10 years Persona 3: • takes the adapted bus to school • lives with both parents (one is an office clerk; the other works at home) • has one sibling • speaks English and French at home • has Cerebral Palsy and uses a wheelchair • enjoys music
Pain (Barriers) • while the school is wheelchair accessible, there are places and spaces Persona 3 cannot get to because of their mobility issues • Persona 3 is lonely and doesn't have friends	Gain (Opportunities) • more wheelchair access • open spaces designed to help students socialize and meet new friends

Student Persona for Empathy Mapping PERSONA 4

Picture: 	Background Information: Age: 10 years Persona 4: • takes the bus to school • lives with both parents (one is a store clerk; the other is a night custodian) • has one sibling • speaks English at home • has Autism • fascinated by insects
Pain (Barriers) • sensitive to sound, light, smell, and touch • has difficulty making new friends • sometimes has trouble finding their way around the school	Gain (Opportunities) • would like a school design that isn't so noisy, full of bright lights, and confusing

Student Persona for Empathy Mapping

PERSONA 5

Picture:	Background Information:
	Age: 10 years Persona 5: • lives within walking distance to school • lives with grandparents and both parents (one parent is a health care attendant; the other is a teacher) • a new immigrant (second year in Canada) • has 2 siblings • speaks Arabic at home • is a gifted athlete
Pain (Barriers) • still learning English so it is difficult to understand some signs/posters/displays at school • the language barrier makes it difficult to make new friends • the outdoor basketball court is damaged so they are unable to play their favourite sport	Gain (Opportunities) • wants to have video/multimedia displays at school • access to google translate • better outdoor sports facilities

Student Persona for Empathy Mapping PERSONA 6

Picture:	Background Information:
	Age: 10 years Persona 6: • lives within walking distance to school • lives with one parent who is a software engineer • only child • speaks English and uses ASL • hearing impaired (wears an aid) • interested in computers and coding
Pain (Barriers) • some rooms/spaces make it difficult for Persona 6 to hear instruction/conversation • as an only child, Persona 6 is always looking for company • there aren't many computers in the school and Persona 6 would love to learn to code	Gain (Opportunities) • rooms that don't echo sound • places/spaces to make friends • more computers and technology