

Sustainability and Resilience Workshops

A VALUES Based Approach to Sustainability

To establish design guidelines that enhance healthy, sustainable, performance-driven environments for learning.

The global conversation on Sustainability is evolving. It has moved beyond a resource conservation movement to include climate change, human health and well-being, resilience, regeneration, and eco-system integrity. Such a broadened definition of sustainability today requires new perspectives in processing competing design parameters to provide a holistic solution that values the health and experience of end users, the immediate local communities and the larger eco-systems. This requires a framework to enhance healthy, sustainable, performance-driven environments for learning.

Through the process of exploring high performance design features of a facility with end-users and stakeholders, DLR Group has developed a framework to evaluate sustainability strategies for a project.

The Sustainability Workshop walked participants through the framework our team developed, called VALUES, and the resulting design strategies that will impact the design and operations of any facility.

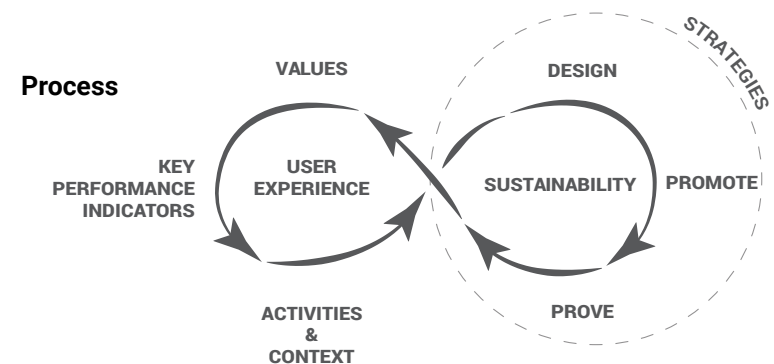
Viewing Architecture through the Lens of *User Experience for Sustainability* VALUES is a dynamic, adaptive framework to design, promote and prove sustainability aligns with end user values by enhancing user experience.

1. Social and Cultural Impact

- ☑ Sustainable design features within the school facility influences the culture within the school while promoting the users to influence their lives.
- ☑ When sustainability is proven to improve user experience and success, the community is more engaged in propelling that message in a larger context.

2. Environmental and Economic Impact

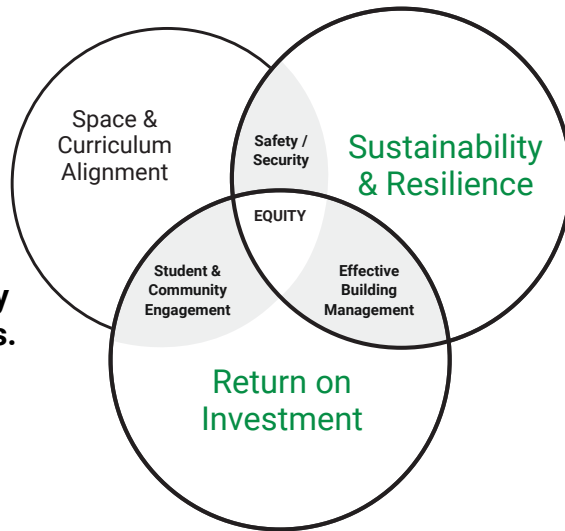
- ☑ Sustainable design that focuses on human health brings user engagement to resources consumed and promotes conservation.
- ☑ When sustainability is proven to save constrained resources, the community is more engaged in the larger conversation of our ecological future.



The VALUES framework relies on an integrated design process that starts with an eco-charrette to identify user values related to sustainability. User values are prioritized workshop participants through conversations about their user experience and the impact from the built environment. A set of success measures are identified and synthesized as Key Performance Indicators (KPIs) specific to each user type through the day-in-the-life exercises found in the curriculum and instruction workshops through multiple conversations with VIDE administrators and various teachers and administrators. Factors of the built environment that impact the user-experience were then analyzed depending on the context in which each user type perform their core activities, which led the integrated design team to develop strategies depending on the priority of the values that were identified as most important.

Approach to Design:

Unique solutions & outcomes driven by multiple perspectives.



Strategies are further evaluated based on meeting the space curricula alignment Indicators and providing the best return on investment. Based on the belief that infrastructure investment will have a better payback if certain aspects of design and operations are promoted during the life of the facility through education, engagement or empowering opportunities, the team selected appropriate strategies, which can be found in the design guidelines that are part of the advancement opportunities section of this master plan.

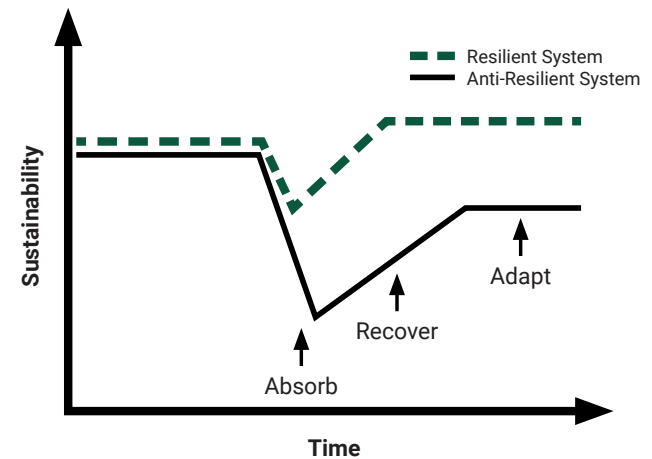


Fig. 1. Resilience as a component of sustainability. Proponents of this organization structure assert that systems that are more resilient can better achieve and maintain sustainable operation.²⁹

²⁹ResearchGate: Resilience and Sustainability: Similarities and Differences in Environmental Management Applications https://www.researchgate.net/publication/320149863_Resilience_and_sustainability_Similarities_and_differences_in_environmental_management_applications

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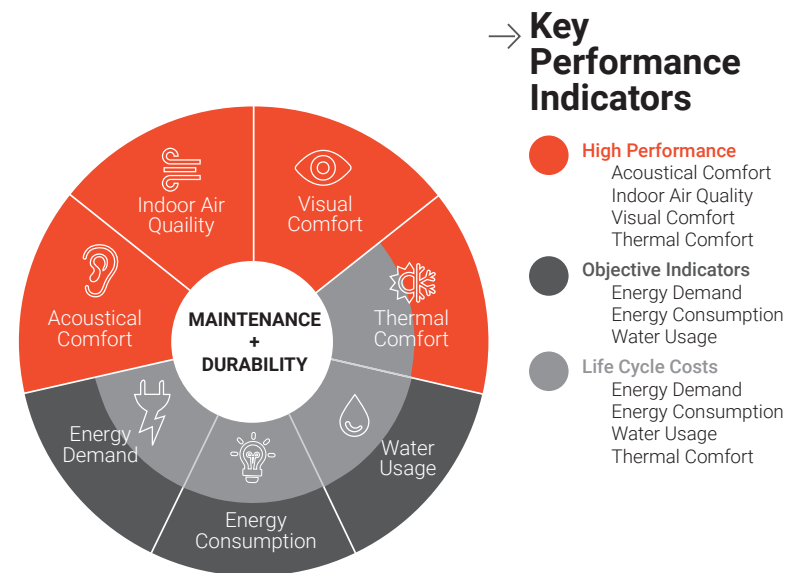
DLR Group facilitated a series of sustainability workshops to explore values related to key sustainability aspects of building design, construction, and operation in the U.S. Virgin Islands.

The workshops were structured around the VALUES framework, an adaptable and scalable tool, developed by DLR Group, to evaluate sustainable design strategies and their impact on user experience. The outcomes of these workshops informed the development of cost effective sustainable solutions for U.S. Virgin Islands Public Schools.

A sustainability workshop was held on St Thomas, St John and St Croix on successive days (February 3, 4 and 5, 2020). Attendees included a broad cross-section of stakeholders and end users, including VIDE leadership, superintendents, principals, teacher union representatives, teachers, facilities staff, community members, local government officials, and the Water and Power Authority.





The workshop started with a presentation to review why sustainability and resiliency strategies are important to the USVI and how they support the VIDE guiding principles and ultimately result in better student outcomes and more resources for teaching and learning.

We explained our approach to sustainability and how it is rooted in creating resilient systems. The groups also learned about how the quality of the indoor environment has a direct and tangible impact on a student's ability to learn. Indoor environmental quality (IEQ) can either promote or detract from focus, collaboration, emotional and cognitive development and functioning.






High Performance Design Indicators were established as:

Subjective Indicators

-  Thermal Comfort
(Temperature and relative humidity)
-  Acoustic Comfort
(Internal and external sources of noise)
-  Indoor Air Quality
(CO2 levels, mold/mildew and materials off-gassing)
-  Visual Comfort
(Quality/quantity of natural and artificial lighting)

Objective Indicators

-  Energy Consumption
-  Energy Demand
-  Water Management and Usage



Planning for Learning Resilience & Sustainability

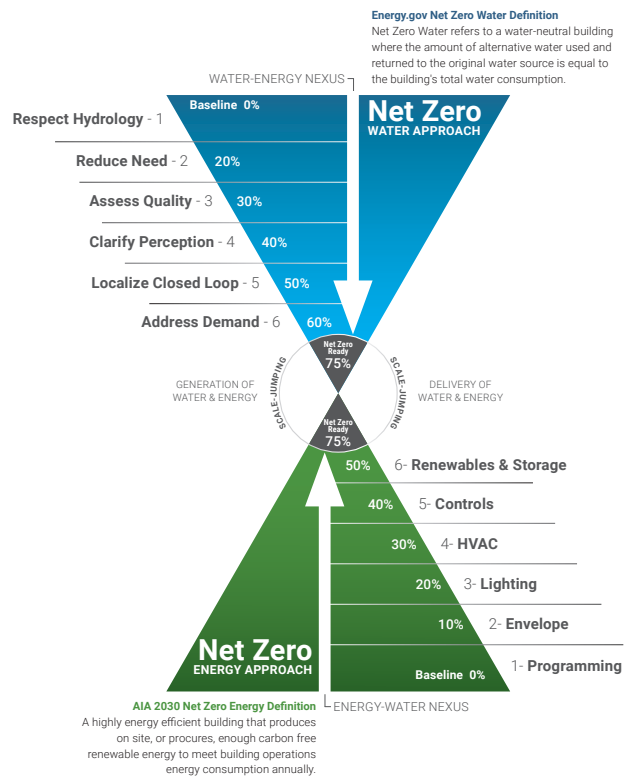
Top Excerpts from the sustainability workshop presentation focused on how thermal comfort, CO2 levels, and lighting impact learning outcomes.

Bottom Excerpts from the sustainability workshop presentation: Four, of ten key categories, informing design excellence.



Sustainability and Resilience Workshops

To demonstrate design excellence and how a design team can utilize an integrated process that includes performance analysis to achieve best educational, organizational and sustainable outcomes a case study of Canyon View High School in Waddell, Arizona, was presented. Ten measures of design excellence that demonstrated process, strategies and outcomes, followed by specific opportunities that would be appropriate strategies for sustainable and resilient design in the Virgin Islands were presented.



1. Design for integration (listen to all stakeholders, identify values and goals, include all design disciplines)
2. Design for equitable community (create partnerships & community access that can be a catalyst for positive change)
3. Design for ecology (design and engineering for your specific climate, habitat and hazards)
4. Design for water (net-zero approach by respecting, managing and utilizing water to best effect)
5. Design for economy (innovative mindset to right-size the facilities and get best value for investment both in the construction and operating costs)
6. Design for energy (net-zero approach with passive strategies first, efficient active strategies next, and renewables last)
7. Design for wellness (design with the user experience at the center of design and include biophilic design principles as a fundamental tenet)
8. Design for resources (net zero waste options, including select materials appropriate in scale, use and climate to minimize waste and corrosion and maximize durability)
9. Design for change (incorporate spatial agility and create flexible small learning communities)
10. Design for discovery (promote the journey of collaboration post-occupancy through greater student/teacher engagement and through surveys and monitoring that verify outcomes)

Following the presentation, attendees were split into three smaller groups and each group was assigned to represent three major end user groups (teachers, students and community) during the VALUES activity.

Through the activity, each group was able to explore, categorize and prioritize key sustainability and resiliency aspects of building design, construction and operation. They were given “chips” that represented their budget for theoretical projects that would be defined through the master plan process and were asked to determine where they would invest that money based on the VALUES important to the end users they represented.

While there was diversity in perspective, there were four themes that consistently rose to the forefront of importance:

Equity and inclusion

Health and comfort

Resiliency and systems

Spaces and resources



Right Canyon View High School | Waddell, Arizona



Sustainability and Resilience Workshops



Top St. John participants organizing and prioritizing their sustainability VALUES.

Bottom St. John participants discuss initial reactions to the sustainability VALUES.



Top St. Croix participants share out their reasoning and ideas around the categorization and prioritization of the sustainability VALUES.

Bottom Small group discussion at the St. John sustainability workshop.





Top St. Thomas participants reviewing and reflecting upon their sustainability VALUES and their allocation of chips.

Bottom A small group discussing the categorization of their sustainability VALUES in St. Thomas.



Top A small group in St. Thomas finalizing the organization of their sustainability VALUES.

Bottom A St. Croix student studies and discusses prioritization of his sustainability VALUES.



Sustainability and Resilience Workshops

Equity and Inclusion:

Almost all Workshop participants spoke about the importance of equity and inclusion, and many stated that it should be the foundation for all other subsequent decisions; and yet it was important to reflect on the many definitions and perspectives for Equity and Inclusion that were part of the conversations.

For many, equity and inclusion mean everyone has access to a quality education regardless of location, socio-economic level, gender, race, learning style and ability (or disability), physical ability (or disability), or mental health.

In terms of the master plan, recommendations should try to distribute both buildings and programs so that students have opportunities that inspire and address many different learning styles. Some participants also expressed the need for equal access for all to useful learning spaces that allow them to explore a passion or career path, as well as the furniture, equipment/technology, goods and supplies necessary to support the educational curriculum being taught.

Additionally, there should not only be adherence to American with Disabilities Act (ADA) requirements but reach for universal design practices that can best meet the needs of all people.

One last important aspect of equity and inclusion was access for and connection to the broader community. While the student groups tended to focus more on needs in the learning spaces, the teacher groups and community groups often indicated how important the site and building design was to enable access and inclusion for community members while still maintaining appropriate security.



Common Vocabulary: *VALUES framework*
Top ranked cards in relation to equity and inclusion.

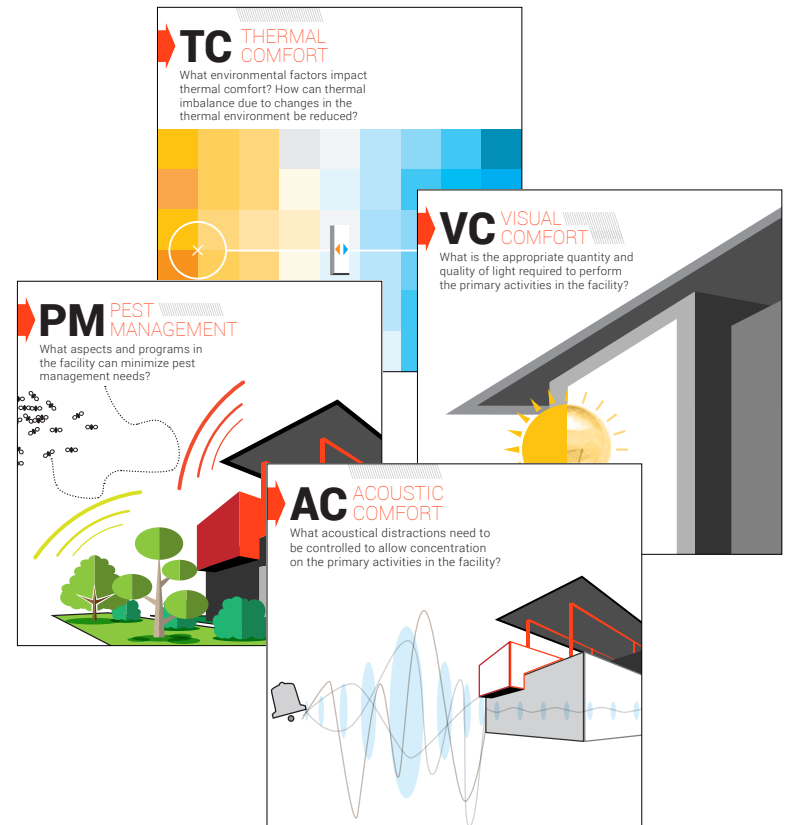
Health and Comfort:

Participants consistently invested a large number of their chips in VALUES that contribute to health and comfort and some groups stated this was the most important factor in delivering a quality education. Indoor environmental quality, which includes air and water quality, acoustic and thermal comfort, appropriately controlled and balanced natural and artificial light, as well as waste, biophilia and pest management are all necessary for best learning outcomes and a positive environment to improve teacher retention as well as reduce absenteeism for students, teachers and staff.

Mold was also frequently brought up as a concern by participants. Additionally, participants identified continuous commissioning as it relates to ongoing maintenance and functioning systems and life cycle costs as important factors in maintaining health and comfort.

The DLR Group team presented ideas on how using passive design strategies and natural ventilation, spaces could be kept cool and comfortable while minimizing the use of air conditioning, reducing systems to be maintained and saving both construction costs and operational costs.

While building materials were occasionally included in the health and comfort investment categories, the conversations focused more on durability and maintenance as opposed to conversations about local materials or materials free of harmful chemicals.



Common Vocabulary: VALUES framework
Top ranked cards in relation to health and comfort.

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Resiliency and Systems:

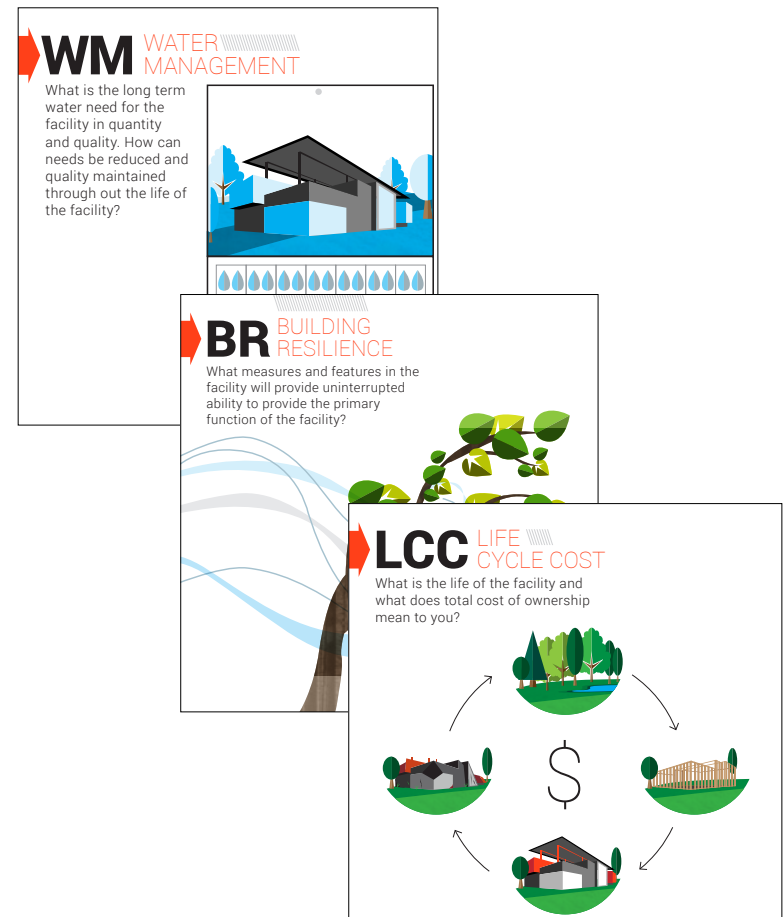
Resiliency in all its permutations, including community, building and emotional resiliency were VALUES that were consistently found in the top two or three categories with the greatest investment.

This is expected given the impacts of climate change and the recent storms, hurricanes and earthquake activity.

Participants understood that these natural disasters will continue to impact the U.S. Virgin Islands and the importance of the VIDE schools' ability to withstand these storms as a place for the community to shelter, to protect their community's investment, to ensure a sense of well-being and security and to protect and provide for a consistent and quality education for the children on the Islands.

Hand-in-hand with resiliency were water management, water hydrology, appropriate land use, site design, innovative building systems, energy and carbon, which not only contributes to creating resiliency but also demonstrates environmental awareness and improves public image.

Additionally, risk adaption and mitigation was a VALUES card often included as measures to ensure resiliency, security and accountability.



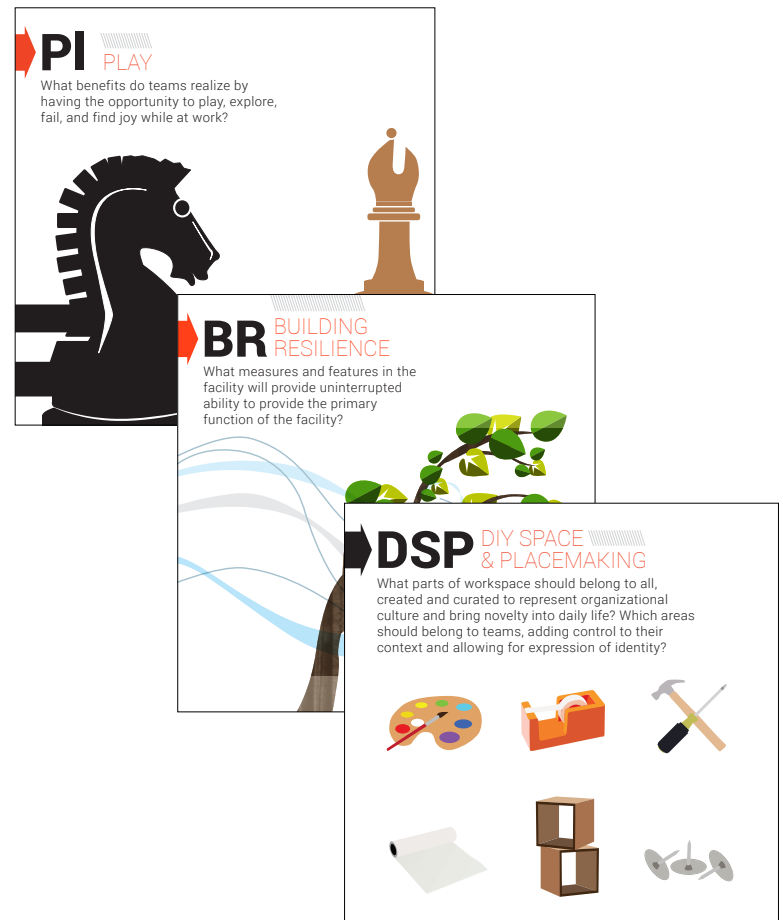
Common Vocabulary: VALUES framework
Top ranked cards in relation to resiliency and systems.

Spaces and Resources:

One additional theme that received a consistently high amount of investment was the need for flexible, adaptable do-it-yourself spaces for expression, learning and play, as well as the need for a cohesive campus fabric and transparent spaces that promote inspiration and connections to occur between age groups and/or subjects while also improving security.

Several groups included design for deconstruction as a means for adapting spaces in the moment and over time to extend the useful life of the facilities.

Additionally, participants identified the need for equitable investment in quality technology, goods and supplies and the need for on-going maintenance and replenishment so that the teachers and students have what they need on a day-to-day basis to teach and learn. As mentioned above, this was also seen as an equity issue as not all schools and teachers have the same access to materials. One teacher group in particular believed that adequate supplies would also encourage collaboration between teachers and expand how teachers teach to include an integrated STEM/STEAM curriculum. Since goods and supplies as well as skilled workers for maintaining facilities are often in short supply in the U.S. Virgin Islands, especially in the aftermath of a natural disaster, it is important that buildings, systems furniture and equipment are all made from durable and readily acquired materials to the greatest extent possible. Further, the career paths in the CTE programs at the high schools should align with many of the employment and possibly even manufacturing needs in the U.S. Virgin Islands.



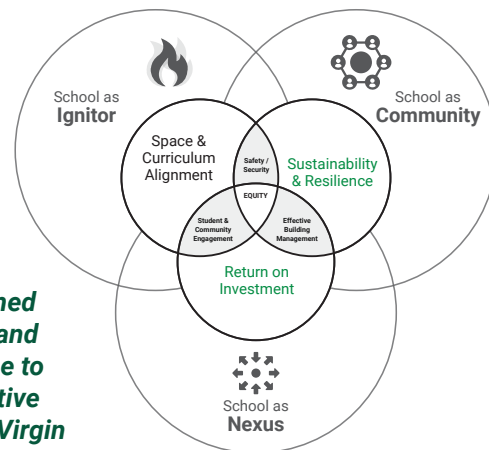
Common Vocabulary: VALUES framework
 Top ranked cards in relation to spaces and resources.

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Return on Investment

Provide manageable building footprints that the VIDE can operate and maintain.

Particularly significant to the U.S. Virgin Islands are climate change and operating/maintenance costs. These forces combined with space curricula alignment are the foundation for the conversation on return on investment. At the root meaning of sustainability is the ability to maintain and the meaning of resiliency is the ability to bounce back in the face of adversity. Best learning outcomes will never be sustained if the facilities are not able to be affordably maintained and withstand hazard events to protect USVI's capital investment and provide for essential community needs like education, community events and shelter.



The VALUES framework informed sustainable design strategies and their impact on user experience to develop a variety of cost effective sustainable solutions for U.S. Virgin Islands Public Schools.

See the executive summary for a description of *sustainability, resilience and ROI* as related to school as ignitor, community, and nexus. Reference advancement opportunities for proposed design solutions.

To provide quality education to all PK-12 students both in the short term as well as in the long-term future, maintainability starts with first right-sizing the VIDE facilities.

Secondly to get the most out of the investment in physical spaces, the facilities must be able to effectively and efficiently respond to the needs of the curriculum over time. Space in a facility is a resource that should be conserved like any other resource, and the first renovation or construction costs associated with space are only a small percentage of the overall operational and maintenance costs; therefore, it is important to plan and design facilities that are:

- ✓ Efficient in their planning in order to build and maintain less while making the best use of space now and in the future.
- ✓ Durable, cleanable and easily maintainable to minimize ongoing costs, with special attention given to those building components where ongoing maintenance is often neglected or difficult and for items that have a long lifespan.
- ✓ Adaptable so that future changes or updates to systems and space can be readily accomplished with minimal disruption.
- ✓ Best able to survive natural or man-made hazard events.

Building systems and materials should be specified based on local availability and local practice and knowledge in the USVI, in order to be appropriately and cost effectively maintained. However, major school renovation and construction projects happening across the USVI are an opportunity to expand the local workforce skills and even include pathways to develop needed skills through the educational programs the VIDE offers. It is important to balance the complexity (or unconventional aspect) of the systems used and the ability to service them, while making sure to take advantage of the best in new system technology.

Additionally, the simplest systems to maintain are often the most resource efficient (energy, water, waste). Specific building and system design proposals for renovation or new buildings should include life-cycle-cost analysis as well as building performance analysis to ensure that they are efficient and operating without creating unfavorable conditions (e.g. causing condensation & mold, energy loss, excess waste, etc.). Additionally, it is important that systems are commissioned and re-commissioned to ensure they are operating as intended. Ongoing training of maintenance personnel will also help to protect the USVI's investment in education and their school facilities.

Long-term maintenance and operating costs are shifting user expectations when it comes to capital cost for investment versus long-term maintenance costs. Building owners want to maximize every dollar invested with the best return on that investment. This allows more dollars to be focused on education and classroom needs instead of ongoing building operations and/or repair after hazard events.

***We shape our buildings;
thereafter, they shape us.***

Winston Churchill,
Former Prime Minister of the United Kingdom