

A Habitat Called Montessori

By CYNTHIA WINANS-BURNS,
HEAD OF SCHOOL

In the fall of 2006, contractors began site preparation for the upper-elementary and middle-school classrooms, the multipurpose building and playing field that will complete the Montessori School of Maui campus.



Bulldozers and graders are not exactly what Maria Montessori had in mind when, more than a century ago, she espoused the concept of the “prepared environment.” What she meant was a setting equipped with the educational tools appropriate to the child’s stage of development. Yet she also talked about “teachable moments,” those serendipitous opportunities for genuine learning that come not from lectures and lesson plans, but from the



PRIMARY STUDENTS VISIT THE CONSTRUCTION SITE REGULARLY, HAVING INFORMAL CHATS WITH WORKERS AND LEARNING ABOUT THEIR JOBS.

child’s own exploration and discovery. They occur outdoors in nature, Dr. Montessori believed, as much, if not more, than in the manmade environment of the classroom. “To go out of the classroom,” she said, “to enter the outside world which

LONG BEFORE THE CONTRACTORS ARRIVED AT OUR UPCOUNTRY MAUI CAMPUS, OUR STUDENTS WERE DOING THEIR OWN “SITE PREPARATION.”

includes everything, is obviously to open an immense door to learning.”

Our campus expansion offers many such teachable moments. Its significance lies not in its scale, but in its mission of sustainability, and in the integration of “green” building practices and an outdoor “living campus” with the Montessori curriculum.

Long before those contractors arrived at our Upcountry Maui campus, our students were doing their own “site preparation”: surveying slopes and elevations to determine the potential effects of storm runoff; researching the plants and animals that live on our rural property, their diversity and their needs; and participating in plans to preserve as much of that life

as possible, despite the disruptions inherent in any construction project.

Inside this issue of *The Seed*, you’ll find examples of what our students have been learning, and how our teachers and staff have combined those outdoor explorations with core academics. (In one lesson, studying the characteristics of our resident frogs and toads led to a graphing of sets that would do any budding mathematician proud.)

More elusive are the nonacademic lessons this living campus invites. We humans aren’t born respecting the world around us; respect grows out of our relationships—out of caring for a garden, planting a tree, building a birdfeeder or a mouse’s home. The intimate connection with one’s environment is also where culture begins; the more we understand it, the better we understand ourselves.



ELEMENTARY STUDENTS STUDY MAPS OF THE CAMPUS EXPANSION TO SEE HOW INFRASTRUCTURE BEING SET IN PLACE RELATES TO FUTURE STRUCTURES.



PRIMARY STUDENTS LEARN ABOUT STORM-WATER MANAGEMENT DURING A TOUR OF THE CAMPUS’S WATER-RECLAMATION SYSTEM.

Academic subjects are, after all, the *tools* of education, not education itself. The challenge for educators in the 21st century is to help our students use those tools to acquire the real-world skills they will need tomorrow, and in the years to come. Once you arrive at that understanding, classrooms that open to the outdoors, and students who are free to explore nature and their own curiosity, make all the sense in the world. 🌱

An Interview with David Soleau, AIA



David Soleau is president and CEO of Flansburgh Associates, Inc., a

Boston-based architectural firm that has designed museums, office buildings, and major residential projects. Soleau’s own work has centered on designing schools, yet even he found himself thrown a few curves when FAI was selected to transform Montessori School of Maui’s vision for a sustainable campus expansion into reality.

SOLEAU: It was a wonderful project to work on, not only because of the collaboration among trustees, administration, teachers, children and parents; but because of a real dedication to the Montessori philosophy in a planned, environmental campus expansion. That collaboration and synergy do not happen often.

MOMI: How did that collaboration inform your design?

SOLEAU: We approached it not so much as an architectural project, but as a community of learning centers within the landscape. To make the buildings unobtrusive in scale, and fitting in with the environment, we broke them down into the smallest components possible: one or two classrooms connected through walkways and loggias. And all of the buildings will have large lanais with windowed walls that slide open, so that part of the classroom becomes the lanai.

MOMI: What makes these buildings “sustainable”?

SOLEAU: The use of natural and recycled materials as much as possible. And we’re bringing in clear-story lighting, up high on

the roofs, to provide natural light. You’ll get a sense both of the plane of the earth, and a view of the sky, a sense of being outdoors. Except on very overcast or rainy days, these classrooms should not need incandescent or fluorescent light.

We’re using big roof overhangs for solar and rain protection, and the buildings themselves will be oriented toward the trade winds. We designed a prototype shutter, very inexpensive, that can be closed against rain, but is designed to be left open most of the time. The trades will blow through, but ventilate up high.

MOMI: So the high ceilings have a purpose beyond an aesthetic acknowledgment of traditional Polynesian architecture?

SOLEAU: There will be a lot of volume inside the buildings, a lot

of air moving slowly, not a strong breeze at table level, blowing papers around.

MOMI: Did you come away from this project with ideas you can incorporate elsewhere?

SOLEAU: We’re designing lots of schools in South Carolina and Georgia. The attitude there is, “Let’s air-condition everything

and close the windows and doors.” It’s a mind-set our energy/oil consumption age has gotten us into.

We see this Montessori of Maui project as a laboratory. The Hawaiian attitude toward the outdoors freed us to explore sustainable building-design ideas we can extend to our work outside of Hawai‘i. We’ve already begun to do so. 🌱



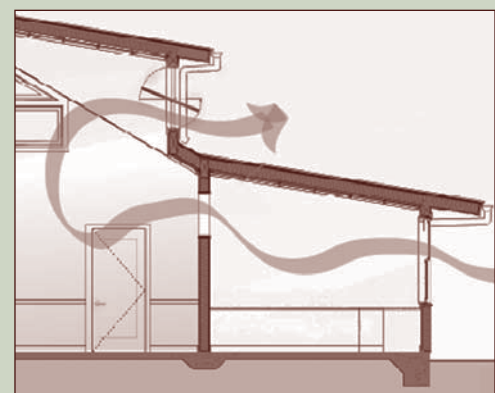
FLANSBURGH ASSOCIATES’ VALERIE CURTIS AND DAVID SOLEAU MEET WITH UPPER-ELEMENTARY STUDENTS IN 2005 TO PRESENT AN INITIAL DESIGN FOR MOMI’S CAMPUS EXPANSION, BASED ON STUDENT AND STAFF INPUT.

An Open-and-shut Case for Natural Ventilation

Located 1,500 feet up the windward slopes of the mountain Haleakala, Montessori School of Maui enjoys cool mornings, warm afternoons, and frequent showers that blow in from the east on prevailing trade winds. To accommodate the school’s desire for natural light and ventilation, while sheltering the classrooms from sun and rain, Flansburgh Associates conceived a prototype shutter ingenious in its simplicity.

Rows of windows set 15 or 20 feet up east- and west-facing walls allow air to circulate gently throughout the

classrooms. The windows are screened, but instead of panes of glass, they are bisected by a long shutter that can pivot from horizontal to vertical. “It takes very little effort to operate the pull cord,” says FAI principal architect Al Ross. “[The shutter] is balanced such that it will close by its own weight.” Open, the shutter creates a reflective light shelf, allowing inhabitants to control the amount of natural light entering the room. Closed, it protects against slanting rain, and the glare of the lowering sun.



SCREENED WINDOWS, SET HIGH IN EAST- AND WEST-FACING WALLS, PROVIDE NATURAL CROSS-VENTILATION. SHUTTERS CAN BE POSITIONED HORIZONTALLY FOR MAXIMUM LIGHT AND AIR FLOW, OR ANGLED TO SHELTER THE ROOM FROM RAIN AND LOWERING SUN. BENEATH ROOF OVERHANGS, RAINSPOTS COLLECT WATER FOR IRRIGATION, TOILET FLUSHING, AND OTHER NONPOTABLE USES.

Wherever possible, MOMI’s site preparation has spared existing trees. When that hasn’t been possible, other conservation measures have come into play—as was the case for a cluster of nonnative silver oaks that had to be removed from the upper campus.

“We salvaged 29 silver-oak logs from the campus, approximately 4,000 board-feet,” says FAI Associate Valerie Curtis. “All that wood will be dried, cured and milled, and used for window and door trim in the classrooms. It’ll also be used for students’ cubbies, and as battens for the acoustic material covering the ceilings. It’s gorgeous wood.”

We welcome news, questions and comments from our readers!

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The Latest Scoop . . .

NEWS FROM AND ABOUT MONTESSORI SCHOOL OF MAUI

News we love to share: Boston-based architects Flansburgh Associates, Inc., received a **2007 DesignShare Award of Merit** for their innovative design for Montessori School of Maui’s campus expansion. DesignShare is an international association honoring excellence in school architecture, especially in its focus on students and learning; its partners include the American Architectural Foundation’s Great Schools by Design, and the George Lucas Educational Foundation’s Edutopia. DesignShare received submissions from 16 states and 11 foreign countries, from which it selected four Honor and nine Merit Awards. One juror called MOMI’s design one of the best he had seen in the entire competition. “This is one of the very few that is conscious about the need for students to experience the outdoors, experience nature, and demonstrate in the design itself, good environmental stewardship.” Clearly, the force is with us. . . . **And in other international news:** The National Association of Independent Schools selected Montessori School of Maui to partner with Southridge

School in British Columbia, Canada, in its **Challenge 2020** program. Each school researched the depletion of stock in local and global fisheries, then collaborated on solutions. . . . **LEED gift:** The Dowling Foundation presented Montessori School of Maui with a \$50,000 grant that will help to pay for MOMI’s LEED certification process. A program of the U.S. Green Building Council, LEED stands for Leadership in Energy and Environmental Design—concepts championed by Maui developer Everett Dowling, whose children, Jack and Caroleena, attended Montessori of Maui. “This is where society’s best ideas take root, with our children,” Dowling wrote. “What better way to help teach kids the importance of protecting the environment than for them to see those values at work in their own school.” . . . **On a roll:** Students in MOMI’s lower-elementary Jacaranda Class raised nearly \$2,000, selling marbles and hand-sewn marble bags to the MOMI community. Those funds will help pay for a photovoltaic panel. . . . **Where there’s a wiliwili:** A proud Dr. Art Medeiros was in the



ON THE LAST DAY OF CLASSES, MIDDLE SCHOOLERS TEST-DRIVE THE CAR THEY’VE MADE FROM RECYCLED MATERIALS. ONE LESSON LEARNED: GROWING SUNFLOWERS FOR BIOFUEL ONLY WORKS IF THE BIRDS DON’T EAT ALL THE SEEDS FIRST.

audience when MOMI’s Wiliwili Class presented a play dramatizing their experiences, collecting and preserving more than 32,000 *wiliwili* seeds. A research biologist with the U.S. Geological Survey, Dr. Medeiros supervised the students’ efforts to save this endangered native Hawaiian tree from the invasive gall wasp. 🌱

From the Guidelines . . .

The way a building is designed influences the learning that happens there; it teaches children—intentionally or otherwise—about themselves, their place in society and the larger world. Think back to your childhood. Was your school a welcoming place that invited curiosity and discovery, or did the buildings resemble a factory in design and operation? What values and behaviors did your school environment encourage?

Given Montessori School of Maui's commitment to a sustainable campus expansion, it was a logical progression to seek a built environment that would intimately connect the classroom and the child with the natural world. That lesson began with concern for the way buildings are constructed, the materials they're constructed from, and such hidden costs as environmental damage and the fuel consumed in shipping. MOMI worked with Professor Stephen Meder of the University of Hawai'i School of Architecture and director of the Center for Smart Building and Community Design, to establish comprehensive guidelines that would help architects, engineers, contractors and others to achieve MOMI's vision. Here are a few examples:

- Design buildings to be adaptable for various uses over their lifetime.
- Design buildings to minimize the amount of materials used in construction.
- Maximize the use of recycled and resource-efficient materials, such as certified forestry products, and locally grown and/or locally produced building products.
- Incorporate solar hot water and water-catchment systems into all buildings, and use captured and gray water for nonpotable purposes.
- Orient buildings to maximize natural ventilation and solar-energy generation.
- Integrate daylight with energy-efficient lighting.
- Use building and operational materials that are resource-efficient, do not off-gas, and have a low embodied energy. 🌱

Text on these pages was excerpted in part from the 96-page Montessori School of Maui Guidelines of Sustainability and Curriculum.

To receive a print or CD copy of the Guidelines, write us at Montessori School of Maui, 2933 Baldwin Avenue, Makawao, HI 96768.

Please indicate which format you prefer, and enclose a check or money order for \$8.00, made payable to "MOMI," for shipping and handling.

MICRO LEVEL: EMPATHY (AGES 3–6)

QUESTIONS

I wonder if animals think like we think? Do you think that a bird/caterpillar/spider tries to build a "dream nest"/"dream cocoon"/"dream web" each time it builds a home? What parts of their separate homes do you think are most important to these animals?



1 Our little ones search the campus for even littler inhabitants: insects and birds, and the habitats they build.

2 Wearing a portable "mini-habitat," Chayton helps Sean collect wigglers for a wormery.

3 Shhh! Students aren't the only ones on campus who need naptime.

4&5 A do-not-disturb sign safeguards a chrysalis youngsters discovered while exploring the campus. Their reward? Seeing it emerge as a butterfly.

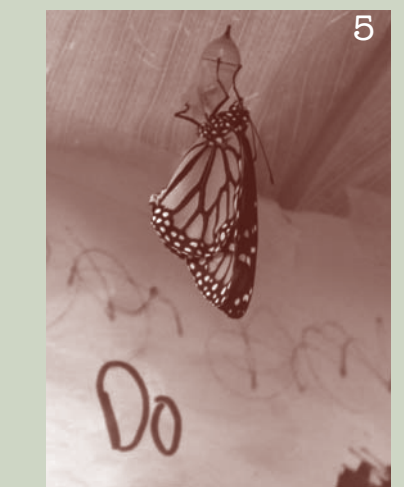
LESSONS

Go on a "sensory scavenger hunt" to introduce the living and nonliving components of a habitat (sun, soil, air, water, food, etc.).

Build miniature habitats for toads, ants, ladybugs, etc., and observe how the animals seem to like these homes.



"Ohhhhhh! Mr. Worm is under the big rock! Wow!"
—Aiden, 2 years old



Lessons from the Earth



MOMI's *Guidelines of Sustainability and Curriculum* is designed to provide pertinent information for any school community interested in creating a sustainable campus. Because we are a Montessori school, our *Guidelines* also incorporates curriculum

concepts based on the principles of Maria Montessori—among them, that the goal of education is "the development of a complete human being who is oriented to the environment, and adapted to his or her time,

place and culture."

Here are examples of opportunities for academic discovery, appropriate for each stage of a child's development, that a study of habitats can generate.

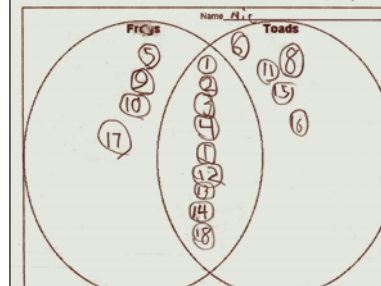
MESO LEVEL: EXPLORATION (AGES 7–11)

QUESTIONS ages 7–9

Have you ever noticed an animal shelter that was poorly constructed? In what way did the home look as if the animal hadn't built it very well?



How Frogs and Toads are a little DIFFERENT!



Cut out labels below and glue them on the Venn diagram above:

LESSONS ages 7-9

Build forts out of natural materials found on campus. Raise toads from tadpoles to adults while providing the right home, or habitat, for each stage in the toads' life cycle. Before releasing the adult toads, see if you can determine which habitat mature toads prefer to build their shelter in. Place a partially submerged clay pot (filled with dried leaves) at several locations on campus. What site does a toad prefer most. Why?



1 Ashley and Alex prepare habitats any tadpole would be proud to call home.

2 A tiny toad is a big reminder of how much life is all around us, if only we take the time to look.

3 Observation of nature leads to a lesson in applied math: a Venn Diagram of how frogs and toads differ, and how they are alike.

4 Having studied how animals use their environment to create shelter, lower-elementary students try their hands at construction, using objects found around campus . . . and gaining respect for other species' abilities.

"I'd like to keep the bees in their beehive. I don't mind if they live right outside our new classroom."

—Elijah, 9 years old

QUESTIONS ages 9–11

If you were an architect, where would you ask the builders to construct the new campus buildings? Why?

Do you think a lot of earth was brought to our campus in order to construct buildings here ten years ago? Do you think a lot of earth will need to be moved to our campus to build here in the future? Why or why not?



1 Tyler and Cameron help construct wormeries whose inhabitants will convert recycled paper into compost.

2 Cleopatra and Marissa study an empty bird nest found on campus to determine why it fell from the tree, and what might have happened to its former residents.

3 From the study of animal habitats, it's a natural leap to explore how other human cultures make use of the objects in their environments. Here, upper-elementary

LESSONS ages 9–11

Research the different styles of homes people build around the world.

Introduce the concept of topography (including slope, contour lines, etc.). Do a topographical study of the campus using handheld GPS (Global Positioning System) units and/or physical steps and measuring tape.



students Jake, Marissa and Kylie construct a teepee and devise a covering of fronds—buffalo hides not being available.

4 As part of their site analysis, students surveyed the campus on foot, calculating slopes and topography and cataloging the trees. Later, using GPS, Eli, Ryder and Joamarco are amazed at how closely their findings match.

MACRO LEVEL: SOCIAL ACTION (AGES 12–15)

QUESTIONS

I wonder if you have any ideas about the most appropriate location for a new building on a piece of land? What do you think is important to consider when selecting a building site?

I wonder if we should set goals for how long our school buildings will be useful?



1 Over the summer, Montessori dads helped the students build a middle-school store. Here, Makena and Maya add a coat of paint. What began as analysis of appropriate construction sites will evolve into lessons in market-based economies, as students establish criteria for the merchandise they'll stock. Store sales will help fund the middle school's biannual trip to Washington, D.C.

2 At a parents' meeting, Kai explains the design concepts behind the new middle-school classrooms. He knows, because he and the other students helped advise the architects.

3 Charlotte rehearses testimony she'll present before the County's Land Use Commission at a Special Use Permit hearing.

LESSONS

Participate in the process of obtaining a special-use permit prior to building construction.

Research school buildings across the globe. Do other cultures place more or less emphasis on classroom quality than we do? What do other cultures do when growing student populations necessitate new school sites?

Raise money to improve an element of the school's current or future buildings (e.g., installing a window to allow increased daylight, installing a photovoltaic panel [solar cell], replacing incandescent bulbs with compact fluorescent bulbs, etc.). Part of this process includes taking ownership of the building's quality, as well as discussing what improves a building's quality or performance.



4 MOMI middle-schoolers Max Kapua-Chiong, Ryan Glavor, and Kai Lenny (not pictured) earned high honors at Hawai'i's 'Olelo Youth Xchange Video Awards, a statewide competition sponsored by 'Olelo Community Television. Glavor, Kapua-Chiong and Lenny won first-place in the Environmental Issues division for their video on potential environmental effects of proposed changes to Maui's Ma'alaea Harbor.