THE DINING COMMONS represents a new direction in design research; architects, public health researchers, educators, and VS come together to examine one of the most complex environmental health issues of our time: childhood obesity. This design-research partnership marks a powerful moment in the design of learning environments as experts from disparate yet interrelated disciplines engage with the problem of childhood obesity by seeking to understand the political, social, economic, ecological, and infrastructural agendas that make up the school food environment. The DINING COMMONS highlights design strategies implemented at the Carter G. Woodson Education Complex in Buckingham County, VA. This K-5 campus project was completed in Summer 2012 with the aim of promoting healthful eating and physical activity with a particular emphasis on the design of indoor and outdoor dining, teaching/activity spaces, and connectivity with the larger community. Follow-up studies will be conducted by academic institutions from across the country.

DR. TERRY HUANG PhD, MPH, CPH. Professor and Chair, Department of Health Promotion, Social, and Behavioral Health. College of Public Health, University of Nebraska Medical Center. Senior Advisor, National Collaborative on Childhood Obesity Research (NCCOR). Dr. Huang is currently one of the leading proponents of the integration of systems science and chronic disease prevention and leads a national and global agenda on research in public health, with a particular focus on childhood obesity, systems-oriented prevention strategies, and the translation of science to policy.

DR. MATTHEW TROWBRIDGE MD, MPH. Assistant Professor and Associate Research Director, Department of Emergency Medicine. University of Virginia School of Medicine. Advisor, National Collaborative on Childhood Obesity Research (NCCOR). Dr. Trowbridge’s academic research focuses on the impact of architecture, urban design, and transportation planning on public health issues including childhood obesity. He was named the 2012-2013 Ginsberg Fellow by the U.S. Green Building Council for his work to better integrate health promotion and green building.

VMDO ARCHITECTS is an award-winning firm located in Charlottesville, VA. VMDO is committed to helping institutions and communities envision pivotal educational projects that translate into meaningful buildings of lasting value. Dedicated to designing environments that positively shape the way people live, work, and play, VMDO recognizes the impact that thoughtful and imaginative design can have on learners, teachers, parents, and the supporting community.

VMDO Project Team: Bob Moje - Principal, Steve Davis - Director of Sustainability, Joe Celentano - Principal / Project Architect, Kelly Callahan - Project Manager, Dina Sorensen - Project Designer, Drew Fleming, Graphics: Brittney Butler, Thomas Bates, Sarah Kott

Sources

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Stop ignoring the evidence

Childhood obesity has more than tripled in the last 30 years
Affects 20% of U.S. children (ages 6-11) and 18% of U.S. adolescents (ages 12-19)
Accounts for $14 billion per year in direct healthcare costs
1 in 3 low-income children are obese or overweight before their 5th birthday
This could be the first time in U.S. history the current generation will have life spans shorter than their parents
THE FOOD INDUSTRY SPENDS $1.6 BILLION A YEAR MARKETING UNHEALTHY FOOD AND DRINKS TO CHILDREN

OBESITY INCREASES THE RISK OF TYPE 2 DIABETES, CARDIOVASCULAR DISEASE, HIGH BLOOD PRESSURE, CERTAIN CANCERS, OSTEOARTHRITIS, AND STROKE

CHILDREN RISK SOCIAL AND PSYCHOLOGICAL PROBLEMS SUCH AS DISCRIMINATION AND POOR SELF-ESTEEM

CHILDREN SEE UP TO 6,100 TELEVISIONED FOOD ADVERTISEMENTS PER YEAR

4% OF ELEMENTARY SCHOOLS PROVIDE DAILY PHYSICAL EDUCATION

LESS THAN 20% OF ALL CHILDREN WALK TO SCHOOL

LESS THAN 25% OF ADOLESCENTS EAT ENOUGH FRUITS AND VEGETABLES EACH DAY

87% OF TELEVISIONED ADS CHILDREN SEE ARE FOR CANDY, SNACKS, FAST FOOD, SODAS, AND SPORTS DRINKS

IT'S TIME TO START REVERSING THE TREND
Q. What are some major challenges that kids face today? How do these challenges affect learning?

ALLEN: I have noticed that many children are [physically] larger and that they don’t get outside as much. I am concerned about the amount of time children play video games or watch television and about poor eating habits.

Q. How do these benefits and/or challenges translate into the new school design?

ALLEN: Our school has the wonderful opportunity to set an example for the community by showcasing the benefits of good nutrition and exercise. Our use of the outdoor spaces for gardening and the food lab and teaching kitchen for hands-on learning related to nutrition will provide real problem solving experiences for kids that will result in unforgettable learning.

Q. When did you, as an educator, realize that the physical school environment is so important for students’ health, well-being, and ability to learn? How are you able to share these ideas with your colleagues and community?

ALLEN: Dr. Gary Blair, Buckingham’s Superintendent during the remodeling of the school buildings, had a vision to improve the lives of our community’s children. I was inspired by him. Reading The Third Teacher, working with the passionate architects at VMDO, and participating in a research project with Dr. Matthew Trowbridge from the University of Virginia enabled me to connect these concepts to my own life and see how the building could have a major impact on our community. My own father died of heart disease at a very early age, and my daughter works as a nurse in a local hospital where many of her patients suffer from preventable diseases. I have come to believe that we can change lives through prevention and partnerships. In addition, we have begun to share these great ideas about health and movement by hosting gardening workshops and training students to give tours of the new facility. In celebration of our new home, teachers are encouraging students to present ideas about movement, nutrition, conservation, and our own history to the community.

Q. How can the built environment, such as a school, make a healthy impact on children’s lives?

ALLEN: Paying attention to indoor air quality and using a team approach will have a major impact on the children and adults that work in the building. I also believe strongly that when adults are modeling good nutrition choices and exercising, then children will learn these good habits. “Nudging” kids to make good choices by featuring appetizing graphics of healthy fruits and vegetables and making these choices more convenient and easily accessible will establish patterns of healthy behavior at an early age. Having a facility that is conducive to exercise will allow more opportunities for movement. Even our chairs [by VS] are designed to allow kids to move!

Q. What benefits and/or challenges do the students in Buckingham County have as a result of living in a rural community?

ALLEN: In terms of benefits, families are often close by and students have the opportunity to get to know grandparents and extended family members. There are many churches that are available for support. We have youth recreation programs. Challenges are that many children come from single parent families and often grandparents have to provide financial support and raise their grandchildren. When it comes to nutrition and the importance of exercise, most young parents don’t understand how important it is to teach these ideas at an early age. Many parents and grandparents have poor health habits themselves and as a result suffer the consequences of heart disease, high blood pressure, diabetes, and cancer. Today’s children are forming bad habits in the area of nutrition and exercise based on family cultures.

Q. As an educator, what changes have you observed in children over the last ten years?

ALLEN: I see lots of single parent homes and unemployed parents. I also see that today’s parents try to make their children happy instead of setting limits and teaching responsibility and stewardship. Kids have a lot of stress in their lives. As a result, we see anger issues, attention problems, and lack of academic progress. Students who don’t have clear limits and strong parental guidance have less self confidence and often perform poorly at school.

Q. What are some unique characteristics of a rural school in a small school district vs. an urban school in a large school district?

ALLEN: Transportation is an issue. There is also a scarcity of opportunities for students to be physically active. We have a youth league program with soccer, baseball, football, and cheerleading, but this is not an option for many families who struggle with vehicle problems or don’t have money for gas. Our younger generation of parents do not plant gardens and find less healthy food cheaper and more convenient.

Q. How can you support a primary research collaborative to study the efficacy of the school design as it relates to childhood obesity? What is your hope for the outcome of this research?

ALLEN: My hope is that through this research Buckingham will become a model rural community whose children grow up learning the impact of exercise and nutrition and will have fewer health problems and lead more productive lives.

Q. What are the top five strategies school districts could use to improve the situation?

ALLEN: More movement during the instructional day, teaching healthy food choices, more after-school programs with recreation choices, gardening, school building renovation.

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Using research on human behavior and psychology, the Cornell Center for Behavioral Economics in Child Nutrition Programs conducts behavioral economics research focused on “choice architecture” – which encourages modifying the setup of school lunchrooms to help “nudge” children to make healthy food choices. Several “choice architecture” changes to servery and food display are simple and inexpensive, yet proven to be effective:  

- Put healthy items within reach or in areas of high traffic.  
- Create speedy “healthy express” checkout lines for children who are not buying desserts or chips. (These express lines are a desirable alternative, given the limited time children have for lunch.)  
- Retain the use of trays. (Children who don’t use trays tend to leave the salad behind because their entree and drink fill up both hands.)  
- Provide choices between healthy items (carrots AND celery, not carrots only).  
- Move the salad bar so that it is next to the cash registers.  

“The choice architecture” relies on the developmental fact that the rational side of decision making is not fully developed in children. They make food choices based on factors such as taste, convenience, and visual effect rather than on price, healthfulness, or logic. 

Key design strategies include 1. making slight alterations in the school lunchroom environment so that healthy foods are prominently available and unhealthy foods are less available and less convenient and 2. empowering children with decision making, so they feel that they are making the choice and not being told what to choose.  

Designing healthy school food environments requires consideration of spaces at multiple scales. Here are a few key components to the healthy foodscape micro environment: 

- Integrating nutrition education opportunities with dining elements reinforces the connection between healthy food and healthy choices.  
- A variety of flexible seating arrangements and locations result in an inviting social atmosphere while providing distinct spaces for various social groups.  
- Including a teaching kitchen, demonstration area, and projection screen enables both nutrition education as well as contact with food service staff as teachers.  
- Ample natural light, proper acoustic tuning, and efficient flow through the servery improve the overall aesthetic appeal of the space.  
- School gardens and play spaces in close proximity to the dining commons provides opportunities to include physical activity as an extension of the lunch period.  
- Outdoor dining spaces can also be used as outdoor classrooms or garden labs.  

Another facet of “choice architecture” focuses on interior design as an integral component of the human ecosystem model, which considers all the external factors that influence human behavior and health. Interior design plays a role in childhood obesity prevention in a number of important ways:  

- Physical elements such as naturally lit classrooms and corridors, monumental stairs, open gathering spaces, and gymnasiums provide increased opportunities for physical activity.  
- Specific features, such as school gyms with cushioned floors, properly positioned computer monitors, flexible classrooms, mobile furniture, stand-at desks, and high quality ergonomic chairs can significantly provide more daily movement and reduce overall sedentary time.  
- Sensory attributes and aesthetic qualities that enhance the enthusiasm, curiosity, and spirit of adventure in children and school staff and promote more active and engaged use of the building spaces.
Q. As a prevention scientist and senior advisor for the national collaborative on childhood obesity research, what changes have you observed in children/adolescents?

HUANG: Since the 1970s, the prevalence of childhood obesity has tripled in the U.S. As a result of obesity, we have been seeing increased incidence of diseases such as type 2 diabetes, fatty liver, hypertension, and poor lipid profiles in children and adolescents. Childhood obesity is also associated with bullying and negative psychosocial outcomes in children. Similar epidemiological trends have been observed worldwide, even in developing countries. The public health field is seriously concerned that, for the first time in history, the current generation of children may have a reduced life expectancy compared to their parents’ generation.

Q. What major challenges do kids have to face today that previous generations didn’t have to deal with?

HUANG: Children growing up today face a much different environment than previous generations did. The cost of fat and sugar has steadily decreased over the last few decades. This means that there has been a proliferation of food products high in fat and sugar, leading to an increase in the consumption of these ingredients. Fast foods have become cheaper and much more ubiquitous. Food marketing has increased multiple-fold, in volume and in dollar amount, and 87% of food and beverage advertising seen by children is high in fat and sugar. The economic reality and family structures have changed over the years as well, with fewer parents being able to afford to stay home with their children. This has contributed to decreased opportunities for home prepared meals. On the physical activity side, clearly the increase in reliance on automobiles, suburban sprawl, and poor urban planning (i.e., lack of street connectivity) have all contributed to decreased opportunities for routine daily physical activity (i.e., not just exercise per se). In the U.S., schools are under increasing pressure to perform in accordance with standardized testing, so health and physical education is no longer a priority. For school breakfast and lunch programs, neither the school budget nor the design of cafeterias is conducive to healthy eating. Taken together, with changes in the family and the broader environment, and constraints in the school setting, it is no wonder that children today have very few choices to be healthy by default or learn how to be healthy.

Q. What external factors have created these challenges?

HUANG: Many of these factors are mentioned above. However, in general, society has not been willing to adapt to new economic and environmental realities by putting in place new policies that can help children become healthy. There is little understanding among the public and policy makers in terms of how the environment shapes our behavior and how policies at the school or higher levels can expand, not limit, families’ choices for health. The Buckingham project is particularly powerful because we have a rural, conservative community that is taking a huge leap forward in creating a school environment that will help students be healthier from Day 1 – and healthy children learn better and have a greater chance of success in the future. Such an act takes a lot of vision and courage on the part of community leaders.

“In the case of schools, working across the educational, public health and design sectors can produce not only beautiful but meaningful architecture as well as simultaneously improve student well-being and school performance. This is a win-win-win situation that should not be missed. This kind of cross-sectoral partnership is key to sustainable solutions for the obesity problem. This kind of partnership can also ensure that we appropriately evaluate the impact of any new design on health and educational outcomes, so that a continuous improvement process can be put in place for future designs. The Buckingham project is a first step towards these goals. Obesity is a societal issue that requires a societal response. Everyone and every sector has a role to play.”
Q. As a member of a committee that helped Michelle Obama shape her agenda on childhood obesity, you were trying to come up with solutions for the obesity epidemic that can be implemented within one generation. What are the priority areas?

HUANG: Michelle Obama’s Let’s Move! campaign embraces the following key areas: empowering families, starting health early in childhood, creating access to healthy foods, increasing physical activity, and improving the school environment for health. These are not necessarily mutually exclusive domains. The Buckingham project is a prime example of improving the school environment for health, by increasing access to healthy foods and physical activity. The community outreach and coordination work that support the construction of the new school will also go a long way in empowering families and mobilizing the community to create a larger scale change beyond the school itself.

Q. What role can school space and architecture/design play in preventing childhood obesity?

HUANG: I think this is a tremendously promising and interesting area, where much more research is warranted. We know the design of space is relevant to one’s sense of well-being, and school space and architecture in particular are relevant to how children learn. It is not a far-fetched idea, as we initially presented in a 2007 article in the journal Obesity, that schools can be better designed to “nudge” students to eat more healthfully and be more active. New York City subsequently published a nice synthesis of ideas related to active living design on the building scale. With the Buckingham project, we were able to delineate design strategies for healthy eating in school architecture. It remains to be seen, with ongoing research, whether these changes can lead to measurable impact in attitudes, norms, and behaviors.

Q. Statistics show a dramatic increase in childhood obesity rates. In your opinion, what are the top 5 strategies school districts could prioritize in order to improve the situation?

HUANG: 1. Put in place and enforce policies that will ensure a healthy nutrition environment.
2. Modify the school environment to “nudge” students to opt for healthier food options or increase physical activity.
3. Limit the marketing of unhealthy foods at schools or school-sponsored events.
4. Bring back physical education in a meaningful way that encourages students to discover how they like to be active.
5. Lead by example. School administrators and teachers must be role models in the school setting.

Q. Can you speak a little regarding the cyclical nature of obesity?

HUANG: From a lifecycle perspective, obesity can be passed down inter-generationally. Obese mothers are at an increased risk of giving birth to obese babies. And obese children are at an increased risk of becoming obese adults. At the individual level, our biology is designed to make weight gain easy and weight loss difficult. This is because our biology evolved to work well in times of food scarcity, but unfortunately it does not fit the current environment of food abundance. Therefore, when people try to lose weight, they easily gain the weight back after a while. This yo-yo effect is another way of looking at the cyclical nature of obesity. To counteract the powerful biology for weight gain, we must think about ways to make our environment healthier for our bodies, including designing environments such as schools where the healthy choices are the easy or default choices.

Q. How does parental and community support play in to obesity prevention? How may schools be used more as a community asset in order to prevent obesity and promote health?

HUANG: We know that parental involvement is critical to the success of obesity interventions in childhood. After all, parents are mostly in control of the home environment and can serve as powerful role models for healthy behaviors. Increasingly, we also recognize that the community environment is important in both fostering values of health as well as putting in place an environment that is conducive to health. Schools have an important role to play because they serve as the connection between the home and the community. Along with parents, schools provide a venue where health knowledge and skills to engage in health behaviors can be taught. In addition, the school environment dictates what students eat and how they move during the day. Therefore, if we can make healthy eating and physical activity the easy and default option in the school environment, we will help children practice a healthy lifestyle without making it seem like work. Over time, healthy lifestyles become healthy habits that endure. The key to obesity prevention is to work across multiple levels, from individual children to parents, schools, and the community, simultaneously.

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### ACTIONS

**IMPLEMENT POLICIES THAT WILL ENSURE A HEALTHY FOOD ENVIRONMENT**

**MODIFY THE SCHOOL ENVIRONMENT TO “NUDGE” STUDENTS TO OPT FOR HEALTHIER FOOD OPTIONS AND INCREASED ACTIVITY**

**DECREASE THE MARKETING AND AVAILABILITY OF UNHEALTHY FOODS**

**ENCOURAGE MEANINGFUL PHYSICAL ACTIVITY**

**LEAD BY EXAMPLE: ADMINISTRATORS AND TEACHERS MUST BE ROLE MODELS IN THE SCHOOL SETTING**
“The global childhood obesity epidemic is more than a wake up call for designers; it marks a crisis of ethos for us as a community of experts who create the environments in which children live, learn, and play. Children don’t decide where to build a home, park, school, or grocery store or if they will have access to an education that includes learning about nutrition and an active, healthy lifestyle. So the ethical question we have to ask ourselves as a design community is: what kind of experts are we if we ignore the evidence. It’s time for a paradigm shift in practice; we must work across disciplines, share knowledge, build networks, partner with researchers, and deploy multifaceted design solutions to reverse the trend.”