The HOM-School

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THE HOM-SCHOOL

By
Malik Benjamin

A THESIS

Submitted to the Faculty
of the University of Miami
in partial fulfillment of the requirements for
the degree of Master of Science

Coral Gables, Florida
May 2009
UNIVERSITY OF MIAMI

A thesis submitted in partial fulfillment of
the requirements for the degree of
Master of Architecture

THE HOM-SCHOOL

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During the second half of the 20th century, there was an epic deterioration of the urban fabric of the typical American neighborhood. Starting with the fleeing of city dwellers into the outskirts of suburbia in the 1950s and the exodus of commercial institutions in the 1970s, neighborhood sprawl hit its stride with the elimination of the neighborhood school in the 1980s. With this community-defining component being replaced by giant, remote educational facilities, the American neighborhood was finally a shell of its former self. If the neighborhood represents the cell, then the home represents the nucleus. In 2003, 1.1 million children were being homeschooled in America, with signs of homeschooling becoming a growing trend. One of the main reasons parents chose to homeschool their children was concern about the environment of other schools. With a large number of students being sent to mega-schools and a growing number of students being homeschooled, there is an increasing gap between the scales of schools being used for education, and neither seems to be a complete solution.

In addition, a significant part of relevant literacy in today’s global community deals with digital literacy. The digital divide is the gap between those people with effective access to digital and information technology, and those without. Many
institutions including the United Nations believe the digital divide is the key to local and
and made accessible through digital means. However, if a person does not know how to
access this information, they are less equipped than the person who does, and the problem

In what ways can low population learning environments be networked into the
urban fabric of a blighted neighborhood for the purpose of improving academic
performance? In addition, what are the social, civic and economic opportunities and
disadvantages afforded to a neighborhood when a digital learning network is overlaid
with a physical network of learning environments?

This thesis intends to reestablish the neighborhood school, by injecting
contemporary, low-population learning environments branded as HOM-S\footnote{HOM-ST\textsuperscript{TM} is not an acronym. It is a branding for the modular architecture which will be used to bridge the gap between the “hom”e and the “s”chool.} to act as a
brand of modular architecture which will bridge the gap between the home and the
school. The solution is proposed as potentially ubiquitous, but for the sake of this thesis I
will be using the neighborhoods surrounding Holmes Elementary School and Liberty
City Elementary School in Miami, Fl, as its site. This neighborhood has a high crime
rate, low testing scores, high dropout rate, lack of positive identity, and low economic
class, and therefore represents the extreme conditions this thesis is poised to remediate.
The program will be defined as a pre-university learning environment that is meant to
complement and correct at-risk education systems and the neighborhoods they serve.

The HOM-S will be a bridge between the home and the mega-school, creating both an “education path” and a campus network for pre-university students. Through the use of flexible technology, distance learning networks, and site sensitive architecture, as well as a re-interpretation of curriculum and teacher-student roles, these environments will be designed to turn deteriorated neighborhoods into healthy communities.
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Chapter 1 INTRODUCTION

PROBLEM DEFINITION

During the second half of the 20th century, there was an epic deterioration of the urban fabric of the typical American neighborhood. Starting with the fleeing of city dwellers into the outskirts of suburbia in the 1950s and the exodus of commercial institutions in the 1970s, neighborhood sprawl hit its stride with the elimination of the neighborhood school in the 1980s. With this community-defining component being replaced by giant, remote educational facilities, the American neighborhood was finally a shell of its former self. Our present educational institutions, many of them fenced-in buildings centered on large quantities of flat landscape, are more similar to federal prisons than places to educate and inspire the minds of the young. In addition, with substantial negative influence on childhood obesity, natural habitat elimination, agricultural landscape removal, traffic multiplication, et cetera, the remote mega-school is not only detrimental to the traditional American neighborhoods that have lost their local schools, but is also detrimental to the greater surrounding region.4

In addition, a significant part of relevant literacy in today’s global community deals with digital literacy. The digital divide is the gap between those people with effective access to digital and information technology, and those without. Many institutions including the United Nations believe the digital divide is the key to local and

global, social and economic inequalities. Information, or knowledge, is being stored and made accessible through digital means. However, if a person does not know how to access this information, they are less equipped than the person who does, and the problem of a gap in knowledge becomes exponentially larger.

This thesis intends to reestablish the neighborhood school, by injecting contemporary, low-population learning environments into at-risk neighborhoods. The school is not embodied in one building, but instead is an education path that includes the home, the HOM-S and the mega-school. Since I believe scalable, decentralized education is the proper method for delivering education, the HOM-S solution is viewed as ubiquitous. However for the sake of this thesis I will limit my site to the Miami neighborhoods surrounding Holmes Elementary School and Liberty City Elementary School. They are two of four long-struggling schools into which Miami-Dade County has poured money and energy in an effort to rehabilitate their programs. More interestingly, and more sadly, these schools are within five blocks of each other, which only hints at the overall negative effects they must have on their surrounding neighborhoods.

Because of their extreme problems, these schools have been the subjects of many experimental and standard improvement techniques including new principals, special tutors, extended school days, and rewards for students who attend weekend and holiday

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classes. If these schools are not B-rated by the end of their five year restructuring period (2009), they could be converted to charter schools or special district-run schools, or they could be taken over by a private company that would report to the school district. Five years ago they were slated for closure, but were left open due to public protest. This opened the door for the five-year rehabilitation plan in place now. The community’s demonstrated desire to keep their school, the apparent openness to the use of technology, the familiarity to experimentation, and the lack of an adequate solution coupled with the neighborhood’s high crime rate, low testing scores, high dropout rate, lack of positive identity, and low economic class represents the extreme conditions this thesis is poised to begin to remediate.

Though this thesis will focus on education in America, it is primarily an architecture and urban design thesis with a focus on technology and its relationship with design. Many social, educational and political issues will fall outside the scope of inquiry. In many ways this exclusion reflects the limitations of this thesis, in that the solution relies upon research by experts from many academic fields. Assumptions concerning the input by these other academic fields will be made, however this thesis will only claim expertise concerning urban design, and architectural and technological solutions.

OBJECTIVES

This thesis aims to answer the following questions. In what ways can low population learning environments be networked into the urban fabric of a blighted neighborhood for the purpose of improving academic performance? Through analogies in social and ecological networks, how can knowledge networks become spatial?
SUB-QUESTIONS

In addition, what are the social, civic and economic opportunities and
disadvantages afforded to a neighborhood when a digital learning network is overlaid
with a physical network of learning environments? Finally, in what ways can a building
form facilitate community building and academic improvement?

What is lost at this scale? What are the pros and cons of home schools? What is
necessary about large schools? What are the spatial and formal consequences of
technologies in terms of lighting conditions and room layouts? What is the relation to
outdoors, space of the city, community and recreation as found through multiple case
studies of responses to site?

SIGNIFICANCE

The project is significant because of the links between education, design, and
quality of life. Thomas Jefferson once noted that literacy and education are fundamental
to our democracy. His observation is perhaps more true today than it was earlier in our
national history. We are a country that spends more per capita on education, graduating a
greater numbers of individuals with degrees of higher education, yet our average literacy
proficiency scores are mediocre compared to adults in other high income countries.8
While it is rare, that our society will collapse in the near future from the uneven
distribution of skills we currently see in America, our nation risks falling behind in
international competitiveness as well as risks becoming more divided along social and

8 Andrew Sum et al., The Twin Challenges of Mediocrity and Inequality: Literacy in the US from an
economic lines. For that reason, if the deterioration of our educational system is related to the deterioration of our nation, and removal of our neighborhood school is related to the deterioration of our educational system, by addressing our built environment we are addressing the existence of our society not just on a local level but also on a national level.

\[9\] Sum, *The Twin Challenges of Mediocrity and Inequality: Literacy in the US from an International Perspective*, 3.
Chapter 2 Literature Review

This section presents a brief review of the literature relevant to the areas the thesis is concerned with: the decline of the traditional neighborhood, the pros and cons of traditional and alternative schooling concepts, the decline of literacy and curriculum integration.

Decline of the Neighborhood

In 1928, LeCorbusier and a group of 23 Modernist architects gathered in Switzerland to write the La Sarraz Declaration which asserted that architecture could no longer exist in an isolated state separate from government and politics, but must become more rational in design, construction and use. These theories, which were refined at the “CIAM IV: The Functional City” in 1933 and eventually published in “The Athens Charter”, promoted the idea of the zoned city comprised of standardized dwellings and separate areas for work, home, and leisure. These ideas are most purely manifested in projects such as Lucia Costa’s Brasilia and LeCorbusier’s Unité d’Habitation in Marseilles, France. In the United States, these urban planning ideas were met with social and government conditions that aided their proliferation and realization. Fueled by mortgage guarantees on new home purchases by the Federal Housing Administration and the Veteran’s Administration, tax breaks for commercial development, and the 1956 Interstate Highway Act signed by Present Eisenhower, the movement of Americans to suburbia began to really pick up steam in the 1950s. These economic changes, coupled

with social issues surrounding race and religion, helped deteriorate the fabric of the American urban neighborhood.

At “CIAM IX: Habitat” in 1953, a group of young architects called Team X (Team Ten) were led by the designers Alison and Peter Smithson, Jacob Bakema, Gerge Candilis, Shadrach Woods and Aldo Van Eyck, and they rejected the prevailing theories of the Congrès International d'Architecture Moderne (CIAM) and urgently promoted a new model of urbanism. Their research focused on patterns of human association and the identification of individuals with neighbors and a neighborhood. They sought to convey the importance of the bond between the arrangement of living units and the observable social interaction of their inhabitants. In addition, they asserted that the built form born from this bond should promote variety, flexibility, and spontaneity.\textsuperscript{12}

In spite of the emergence of this new Brutalist movement, the on-going deterioration of the American urban fabric was, and continues to be driven mainly by removing the primary components of the traditional neighborhood – businesses, commercial and civic functions, and placing them in distant, isolated pods. Citizens are forced to leave their neighborhoods which previously contained all of these components, and are enticed to move closer to one of these components. A person must now decide whether to live near work or a child’s school, or to live close to a favorite restaurant or park. In most cases, it is no longer possible to do both.

The working conception of traditional urbanism used throughout this thesis grows out of criticisms voiced by historian Lewis Mumford in *The City in History* and Jane Jacobs in *The Death and Life of Great American Cities* and is informed by the reconstruction of more recent theories of urbanism expressed by architect Leon Krier and theories of "pattern language" developed by Christopher Alexander. This movement is the latest in a lineage of rebellions to the theories proposed by the Congrès International d'Architecture Moderne. Andres Duany and Elizabeth Plater-Zyberk (DPZ), prominent founders of New Urbanism, are two of the most compelling proponents of this conception of traditional urbanism. In *Suburban Nation*, DPZ argues persuasively that from the founding of America through World War II, the traditional neighborhood structure was composed of mixed-use, pedestrian-friendly, sustainably growing community networks.13

DECLINE OF LITERACY

American literacy is experiencing a perilous steady decline in comparison to literacy within countries with similar Gross Domestic Product statistics. In 2001, the Educational Testing Service released a report of two studies International Adult Literacy Survey and National Literacy Survey. These studies were administered to 23 countries for the purpose of measuring the literacy of their population. According to this study, literacy is defined as “using printed and written information to function in society, to achieve one’s goals, and to develop one’s knowledge and potential”. The study was divided into three scales which were defined as prose literacy (i.e. understanding poems, poems, poems).

warranties and other forms of prose), document literacy (i.e. understanding maps, graphs, job applications et cetera) and quantitative literacy (i.e. being capable of balancing a checkbook, tip and using number data embedded in printed materials). Though there were several disparities exposed by this survey, there was one particularly telling trend that relates directly to the issue of schooling. The US literacy ranking based on age group showed our younger generations were ranked at the bottom of the pool while older generations ranked at the top. Adults with stronger proficiencies are more likely to participate in the global labor market, avoid unemployment when they do seek work, gain access to more highly skilled and higher wage occupations, obtain training and education from their employers, and receive higher weekly and annual earnings from their jobs. With the forces of globalization, technological change, deregulation, industrial and corporate restructuring, and increased domestic competition changing the face of global labor market, this age based trend points to a disturbing loss of competitiveness for future American workers.  

In addition, a significant part of relevant literacy in today’s global community deals with digital literacy. The digital divide is the gap between those people with effective access to digital and information technology, and those without. According to the Pew Internet and American Life Project 2008, only 42% of American households making under $30K have broadband access in their homes compared to that of 82% of

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14 Sum, *The Twin Challenges of Mediocrity and Inequality: Literacy in the US from an International Perspective*, 8-29.
households making more than $75K.\textsuperscript{15} Many institutions, including the United Nations and One Laptop Per Child initiative founder Nicholas Negroponte of MIT’s Media Lab, believe the digital divide is the key to local and global, social and economic inequalities.\textsuperscript{16} This belief is due to the key word in the definition of the digital divide – information. Information, or knowledge, is being stored and made accessible through digital means. However, if a person does not know how to access this information, they are less equipped than the person who does, and the problem of a gap in knowledge becomes exponentially larger. Just in the last decade, we have seen a transformation in science as it moves from a theory based method towards that of cluster processing. This Google-esque scientific approach uses large amounts of data to look for correlations and inconsistencies, and one day may make theory-based thesis, like the one you are presently reading, antiquated. Basic and digital literacy are a becoming increasingly more valuable necessity of civilized life.\textsuperscript{17}

**CURRICULUM INTEGRATION**

Curriculum integration is a curriculum design that is concerned with enhancing the possibilities for personal and social integration through the organization of curriculum around significant problems and issues that are collaboratively identified by teachers and students, without regard for subject-area boundaries. In curriculum integration,


\textsuperscript{17} Anderson, “The Petabyte Age: The End of Theory,” 106-121.
organizing themes are drawn from life as it is being lived and experienced. Such collaboration opens the way to redefining power relations in the classroom and to challenging the idea that important knowledge is only that named and endorsed by academics and bureaucrats. Curriculum integration also involves applying knowledge to questions and concerns that have personal and social significance. With its emphasis on participatory planning, contextual knowledge, real-life issues, and unified organization, curriculum integration provides broad access to knowledge for diverse young people and thus opens the way for more success for more of the participants. In short, curriculum integrations is composed of four major themes: integration of experience, social integration, the integration of knowledge and the integration as a curriculum design.18

Former project director for New York State Regional Education Planning Centers James A. Beane, conducted a series of interviews with students who spent one year in a curriculum integration learning environment and one year in a traditional separate-subject arrangement. In these interviews, several students stated the aspect of their curriculum integration learning environment they missed most was the “the sense of community.” Among other purposes, curriculum integration is intended to promote social integration. The sense of community is built not only on the relationships among the adults and young people but also on the idea that they are mutually engaged in addressing shared

18 James A. Beane, Curriculum Integration: Designing the Core of Democratic Education (New York: Teachers College Press, 1997), x-xii.
questions and concerns. In these ways, young people have an opportunity to learn through experience the social knowledge that is part of the democratic way of life.\textsuperscript{19}

SCHOOLING CONCEPTS/ALTERNATIVES

The decline of urban neighborhoods, neighborhood schools, and the rethinking of school curricula in a digital age suggests a reconsideration of alternative school models in a neighborhood context.

REGIONAL SCHOOLS

In the summer of 2000, historic neighborhood schools were added to the National Trust for Historic Preservation’s annual list of America’s Eleven Most Endangered Historic Places. In line with this movement, Constance E. Beaumont, National Trust for Historic Preservation Director for State and Local Policy with the assistance of Attorney Elizabeth G. Pianca wrote a report that focused on the obvious and intangible value of neighborhood schools. The listing and report were in response to requests from neighborhood organizations that wished to save schools they saw as important, but were deemed unfit for contemporary education and too costly to improve by government institutions. Some education experts believe that large schools are better because they provide economies of scale, offer students more subject offerings, and permit more competitive sports teams.\textsuperscript{20} In addition, many new schools are better equipped than their predecessors, and more accessible to a greater number of students. Nevertheless, the

\textsuperscript{19} Beane, \textit{Curriculum Integration: Designing the Core of Democratic Education}, 64-65.

elimination of the American neighborhood school has brought with it several negative
effects on the American neighborhood.

Regional schools often are large buildings centrally located in expansive
quantities of flat landscape (parking, tracks, fields, et cetera) surrounded by high fences.
National guidelines recommended to states by the Council of Educational Facility
Planners International call for at least 10 acres of land plus one acre for every 100
elementary school students, at least 20 acres of land plus one acre for every 100 middle
school students, and at least 30 acres of land plus one acre for every 100 high school
students.\textsuperscript{21} In my opinion, the scale and siting of these buildings hold greater
resemblances to federal prisons or warehouses than to traditional places to educate and
inspire the minds of the young.

In terms of interconnectivity, many regional schools are not within walking
distance of the neighborhoods they serve, and as a result, children have to be bused in.
At first glance this simple fact may appear inconsequential, however, the preference for
vehicular arrival over pedestrian friendliness results in an increase in traffic, a decrease in
walking and therefore an increase in obesity.\textsuperscript{22} In addition, the isolation of these
institutions results in an isolation of a great economic engine. By isolating schools, and
increasing the amount of time parents, teachers and students spend in traffic, there is less
time and frequency of opportunity for interaction with commercial centers, the lifeblood
of any municipality. After spending two hours a day in their cars, families are less likely


\textsuperscript{22} Robert Cervero et al., \textit{Environmental Implications of School Siting} (Washington, D.C.: United States
Environmental Protection Agency, 2003), 3.
to spend quality time with each other on a daily basis. In the end, the stress between weekday and weekend activities becomes more distinct, routine sets in, and automaton homogeneity occurs.\textsuperscript{23}

Some regional schools are placed on the outskirts of town typically on land that was formerly used for natural habitat or agriculture. For example, on the boundary that separates the agricultural region of the Redlands and the residential Miami-Dade County neighborhood known as the Hammocks, there are three elementary schools and two high schools built using specifications similar to those recommended by the Council of Educational Facility Planners International. These schools are within a mile of each other, yet do not share playing fields and other resources, thereby making inefficient use of the natural habitat and agriculture land they have replaced.\textsuperscript{24}

Natural habitat has apparent importance to the global atmosphere and the survival of the animal community, but it also has recreational uses. Canoeing, hiking and spelunking are examples of activities that promote a healthier group of citizens. If natural habitat is deteriorated or moved further from the local citizenry, there is a decreased opportunity for the average citizen to visit them in lieu of turning on Animal Planet or playing with their Nintendo Wii. On the other hand, agriculture offers biology, life sciences, technology (ex. irrigation) and other “in-the field” related learning opportunities. The use of a garden as a necessary part of pleasurable human existence


\textsuperscript{24} The boundary is located on Kendall Drive between 157\textsuperscript{th} Avenue and Krome Avenue. Schools include Oliver Hoover Elementary School, Dr. Gilbert L. Porter Elementary School, Christina M. Eve Elementary School, Felix Varela Senior High School, and John A. Ferguson Senior High School, http://www.dadeschools.net/.
can be seen everywhere from LeCorbusier’s *Cinq Points de la Nouvelle Architecture* to the contemporary neighborhood urban garden.

**HOMESCHOOLING**

The modern home school is the most intimately scaled educational environment, and is one that arouses great debate. About 1.1 million students (1,096,000) were homeschooled in the United States in the spring of 2003, which represents a 1.7 percent increase from four years earlier. In the 2003 National Household Education Survey (NHES), parents were asked whether particular reasons for homeschooling their children applied to them, and which one of those applicable reasons was their most important reason for homeschooling. Thirty-one percent of homeschoolers had parents who said the most important reason for homeschooling was concern about the environment of other schools or a desire to provide religious or moral instruction. An additional sixteen percent of homeschooled students had parents who said dissatisfaction with the academic instruction available at other schools was their most important reason for homeschooling.²⁵

Milton Gaither, a professor in the Department of Education at Messiah College and an avid homeschooling blogger, has narrowed the cause for the birth of the 20th century homeschool to four reasons. First, American sensibility became that of countercultural sensibility. Separation of church and state as well as racial integration represented a clash between American law and culture, and the suburbs and homeschool gave

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refuge to those who wished to resist those changes. Second, suburbanization encouraged many young alienated people to challenge the system by leaving it, founding communes, and pioneering homeschooling. Third, countercultural leftist Americans inherited the romantic ideals of child nature, born of Rousseau and come of age in the progressive movement, and therefore chose to liberate their kids from what they took to be the deadening effects of institutionalization by keeping them at home. Finally, as public schools grew larger, more bureaucratic, more impersonal, less responsive to parents, and less adaptable to individual or local cultural variations, many families felt increasingly alienated. The homeschool offered parents more control over what their children were exposed to and according to some strengthened the family unit.

It should be noted that it is incorrect to think homeschooling was an inevitable result of a few broad social forces. It happened because determined citizens challenged the dominant approach to childhood education. Intellectuals articulated the vision. Parents put it into practice. Lawyers and politicians worked to smooth the way while organizations emerged to facilitate networking among homeschoolers. Lastly, entrepreneurs and corporate conglomerates rushed to meet the demand of the growing movement for curriculum materials.

26 Rousseau believed it was possible to preserve the original nature of the child by careful control of his education and environment based on an analysis of the different physical and psychological stages through which he passed from birth to maturity. Stewart, W. A. C. and McCann, W. P. (1967) The Educational Innovators. Volume 1 1750--1880, London: Macmillan.


SMALL SCHOOLS

Many neighborhoods consider their local schools as a substantial part of their community identities. With several generations making up their list of alumni, schools offer many citizens an emotional connection to their neighborhoods. This emotional connection is well founded. For example, within 16 years of arriving in America, the Pilgrims founded Harvard College. Harvard College was opened initially to train Puritan ministers. Considering the Pilgrims came to America to escape religious persecution, the creation of a place for religious education must have been an important accomplishment to them as religious exiles.\(^29\) Schools have also historically been among the first civic buildings to form the core of most traditional communities. In the plan of Williamsburg, Virginia, the College of William and Mary is placed at one end of Gloucester Street and the Capitol at the other. Placed on opposite sides of an outdoor civic space called the Palace Green, education and democracy instead of religion or monarchy represented a new civic identity. Against that historic precedent, it is easy to comprehend how the school as a civic building represents a collective identity for the community.\(^30\)

In addition, many schools today perform services greater than simply that of educating children. They provide venues for many community activities, including fairs, voting, blood drives, plays, cinema, musical performances, adult education and community improvement organization meetings. It is a wonderful symbiotic relationship. The after-hour activities enhance the school’s role as a place for communing, while the


secondary purposes are provided with facilities they would not otherwise be able to afford. With all of these primary and secondary purposes in play, it is a shame that many neighborhood school buildings have become empty, boarded up or demolished.31

Traditional measures of educational achievement have shown students in local schools to be lagging behind their regional school counterparts. However, it can be argued with considerable validity that students in these smaller schools may be learning values in self-reliance, human relations, character development, and other areas not measured by standardized tests. In addition, small schools offer a solid basic education program and have far fewer problems with discipline, drugs, vandalism, and truancy. Nevertheless, it should also be noted that small schools cannot always provide the extensive curriculum offerings found in regional schools.32

Chapter 3  ALTERNATIVE NEIGHBORHOOD SCHOOL MODELS

This section presents a review of alternative models for the HOM-S which are sensitive to class size, the use of technology and atypical interaction with institutions of higher learning.

HISTORIC ONE ROOM SCHOOL

The one-room schoolhouse was the typical school during the early 1800s. One room schoolhouses have been the environment of education for individuals as varied as Herbert Hoover (31st US President) to Jimmy Wales (Wikipedia co-founder). The schoolhouse was the focus for thousands of rural communities, hamlets and small towns, providing not only a place for education, but also for hosting town meetings and festivals. In the one room schoolhouse environment, one teacher was responsible for the education of multiple grade levels. This fact influenced the decision to use a single room. In a single room, the teacher could easily present work to a specific grade level, initiate their study period, and move on to present work to a higher grade level. In some ways this form of instruction can be distracting since most teacher-student interaction required reciting lessons out loud. However, due to being in one space, children were exposed to every lesson. In addition to students receiving instruction from the teacher, younger students also received instruction from older students. This flexibility allowed for students to advance at their pace. For instance, if a student was able to complete their assignment ahead of schedule, they then had the chance to hear older students recite. As
a result, it was not uncommon for children to master the more advanced work of upper
grade levels.  

In 1981, Margaret K. Nelson, a professor of sociology at Middlebury College who
was interested in the social history of the teaching occupation in Vermont, conducted a
series of interviews for the purpose of determining if the occupation of school teaching
attracted different kinds of individuals in its two forms – one room schoolhouse and
consolidated school. Because of its geography (mountains, farms, isolated towns) and
climate (snow in winter, mud in spring), as well as a tradition of maintaining local control
of small schools by their surrounding towns, Vermont was a useful site for this research
survey. During this survey, she found that the majority of women who had taught in both
one-room and consolidated schools were clearly divided in terms of preference.  

Women who had transitioned from the one-room schoolhouse to the consolidated schools
felt a loss of autonomy, status and sense of mission in the consolidated school. In the
one-room school, the teachers felt they could adjust curriculum based on their students’
needs, provide non-academic services such as hot lunches, build a close relationship with
the children and their families, and create an environment that was an extension of the
home as opposed to a separate institution. The one-room schoolteachers worked long
hours for little pay in isolated, poorly equipped schoolhouses. They were responsible not
only for educating a broad range of children but also for maintaining the schoolhouses,
keeping them warm, feeding the children, and supervising their every activity throughout

33 Ben E. Graves and Clifford A. Pearson, School Ways: The Planning and Design of America's Schools

34 Margaret K. Nelson, "From the One-Room Schoolhouse to the Graded School: Teaching in Vermont,
the day. An outsider might view their job as exploitation of the assumed "feminine" traits of love of children and commitment to the community. But that was not their view. They saw themselves almost as missionaries involved in a critical educational and social endeavor. When they left the one-room schoolhouse for the more modern consolidated schools, they began to feel like assembly workers. They felt their job was diminished.35

To the contrary, teachers who had transitioned from the consolidated school to the one-room schoolhouse held an alternative perspective. In the one-room schoolhouse they felt they missed the support of the principal, administrative staff and fellow teachers with whom they could discuss problems and share difficulties. In addition, they felt the one-room schoolhouse placed them in close and constant scrutiny of the parents. In short, the one-room schoolhouse inhibited them from focusing on the task of teaching. They stressed the professional characteristics of the consolidated school work environment which afforded opportunities for true professional engagement. In the consolidated school, they had an occupation with stiff entry requirements, specific work, a decent salary, colleagues, and peer, rather than community, control over the behavior of its members. They saw themselves as distinct from the earlier group of teachers whose role they felt was closer to that of a volunteer-do-gooder's than a true professional's.36

In conclusion what Nelson found was that the two groups of teachers did not directly contradict one another. Nelson believed it was a combination of the school a

teacher attended as a child, as well as the school a teacher attended for training, that
predetermined their preference. In many ways, one-room schoolhouses have been
romanticized in Western novels, movies and television production. On the contrary, it
should be noted that they were often noisy environments, and in some ways ill suited to
the process of education. Nevertheless, it is the longest surviving school system in the
United States, and though it is no longer the prevailing form used for academic facilities,
as of 1990 there were 729 one-teacher public schools in operation in the United States.

LEARNING COTTAGES

Each year Architecture for Humanity, a nonprofit design services firm focused on
building a more sustainable future through the power of professional design, hosts the
Open Architecture Challenge design competition. The Open Architecture Challenge is
designed to bring public attention to inequities in the built environment affecting the
health, prosperity and well being of under-served communities. The 2009 Open
Architecture Challenge focused on the issue of portable classrooms, specifically tackling
the health, environmental and performance concerns associated with today’s portable
classrooms. Health concerns among students include headaches, nausea, and increased
asthma attacks, which have been linked to exposure to building material emitted toxins
including formaldehyde, poor ventilation, poor lighting, and poor acoustics. In addition,
temporary classrooms are notorious for having high energy consumption and loud HVAC
systems. This coupled with an overall lack of visual appeal, perceived inferior building

37 Nelson, "From the One-Room Schoolhouse to the Graded School: Teaching in Vermont, 1910-1950": 19.
38 Graves, School Ways: The Planning and Design of America's Schools, 21-22.
quality, decreased amenities, poor site planning, poor long term planning, and poor maintenance results in an environment that interferes with learning. Nevertheless, temporary classrooms, like those manufactured by William Scotsman, are a necessary resource for a rapidly growing school.40

It is often difficult to predict when a particular school will outgrow its available facility and thereby difficult to develop a plan to obtain funding for new building construction. For that reason, many school systems have turned to using mobile trailer-style units to provide additional classroom space at overcrowded schools. Initially intended as a temporary solution, many of these mobile classrooms have stayed on the same site for years. For example, the Charlotte-Mecklenburg School (CMS) system currently educates approximately 107,000 students each year. Over 20,000 of those students attend classes in 1,059 mobile classrooms. Those figures show that approximately 20% of the students in the school system will receive a large amount of their education in mobile trailer-style units. Thus, the lifespan of a mobile classroom and the excessive maintenance needed over long periods of time become an issue for school systems. The mobile trailer-style classroom may seem to have an advantage due to its initial cost. Yet, there are several disadvantages. Most mobile classrooms are poorly designed and constructed. They lack sufficient windows for cross ventilation and natural daylight, and are visually unappealing. These deficiencies lend a negative image to any school and the learning experience. The mobile classrooms also consume valuable campus open space, even when they are sited very close to one another. In addition to

the high number of students attending class in mobile classrooms in the CMS system, nearly 48% of the mobile units were more than 30 years old in 2003. In the state of Florida the age of portable classrooms in public schools averages 20 years, whilst some are 50 years old. In this fast-growing school system, mobile classrooms have been fairly immobile. Generally, mobile units are only replaced when a permanent expansion is completed. As a response to this specific situation, the Learning Cottages was developed by Duany Plater-Zyberk & Company Green (DPZ Green).

Though the Learning Cottage was developed as a study, it represents a potential tectonic and spatial prototype for the HOM-S. The standard Learning Cottage building is 80’ long by 24’ wide. The construction method, which uses a four-foot Structural Insulated Panel System (SIPS), can quickly be assembled on site in approximately six weeks. SIPS is a highly wind resistant, very energy efficient, and durable green building system. The standard plan allows for two classroom spaces measuring 34’ x 24’ apiece, which accommodates approximately twenty to twenty-five students each. In addition, each cottage has two restrooms measuring 8’ x 6’ apiece, allowing for separate facilities for males and females. Each classroom has three points of egress. Two of those open to a pair of foyers in the center of the building; the third provides access to the exterior plaza and green space. The symmetry and simplicity of the plan creates flexibility within the building allowing the floor plan to be adjusted to various uses. In many ways, the simplicity of the Learning Cottage represents the tectonics of a building that fulfills basic

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student-teacher needs while remaining a flexible space for implementing creative, technology-assisted curriculums.\textsuperscript{42}

\textbf{DAVIDSON ACADEMY}

Public schools currently lack the resources to accommodate not only the children with the greatest difficulties learning but also those who are the most gifted. Jan and Bob Davidson, authors of “Genius Denied” founded the Davidson Academy of Nevada to address the later concern. Bob is a retired businessman, and his wife is a former educator. In the 1980s, they spearheaded a software program called MathBlaster, the first of a series of educational programs that were massive best-sellers. According to the Davidson's book, they were driven to open the academy out of concern that schools in the United States were underserving the very brightest students.\textsuperscript{43} The symptoms for children who are over-challenged versus children who are under-challenged by their school work are similar. Both student types disrupt classes, refuse to do assignments and appear generally disinterested. For this reason, I agree with Davidson Academy that one size-fits-all education makes no sense, whether a child is very bright or not.

In regards to the Davidson student body of 44 pupils, teacher Darren Ripley has found that not all “profoundly gifted kids are profoundly gifted at everything.” The academy is a public school, free to students and comprised of two classrooms at the back of a campus building at the University of Nevada. There you will find 11-year-olds

\textsuperscript{42} DPZ Green, \textit{Learning Cottages}, http://www.learningcottages.com/.
\textsuperscript{43} I would contend that American schools are actually underserving the majority of their students, bright and otherwise.
taking Chinese or third- and fourth-year high school algebra, 12-year-olds intensively studying Eastern civilization, and 14-year-olds taking honors biology or hopping a shuttle bus to take college courses at the University of Nevada. This link to a college or university is a typical characteristic of experimental schools and represents a belief in vertical integration of curricula. In addition, since university curricula tends to be more flexible in terms of scheduling and course variety, the link to a university provides a more personalized curriculum for the younger students.

In many ways, the Davidson School represents the scale, access to higher university resources and curricula customization HOM-S wishes to make available to the general public. In addition, students at the Davidson Academy are from all over the United States, a fact that requires some families to move great distances. HOM-S wishes to explore the possibility of providing the benefits of the Davidson Academy, while bringing the education to the student. 44

THE SCHOOL WITHOUT WALLS

The School without Walls (SWW) is a public magnet school located in Washington, D.C. that serves grades 9-12. In general, DC students attend schools based on local zoning boundaries, however School Without Walls is open to all DC teens. Located in an urban setting at the heart of the George Washington University at 2130 G Street, NW, the student body represents every quadrant of DC. SWW students pursue traditional assessment through Advance Placement (AP) courses, college courses at

George Washington University and Howard University, and humanities-social science programs integrated throughout the curriculum with support from the Gilda Lehrman Institute of American History. In addition, Walls’ students are encouraged to build experience through international exposure, community service, internships, and senior thesis capstone projects. This community of motivated learners and teachers fosters formal and informal relationships among students, faculty, administration, families, George Washington University, and partners. It represents the community driven form of education that supports HOM-S connection to the neighborhood. Presently, the school has a population of 440-students and as of 2009, students will be able to earn an Associate’s degree from the George Washington University during their junior and senior years of high school.

Situated in a 19th-century building with a 21st-century addition, the school design blurs the physical and programmatic boundaries between a small urban high school and a research university. Providing substantial daylight was an important factor in the rehabilitation of the historic. In line with the schools basic philosophies, the school building provides state-of-the art labs, classrooms, a large and flexible “commons,” a media center with views across the academic district and the school’s first controlled outdoor space—a second floor roof terrace. The entire half-acre site has been designed to ensure that every space, particularly the public space, provides formal and informal learning opportunities. For example, small seating areas within the atrium of the new building echo the central hall of the historic building. By promoting such positive
interaction, the building fosters a subtle sense of security and encourages the continued creation of a strong learning community.45

VIDEO GAME ACADEMY

Indiana University associate professor Sasha Barab and other educators are developing alternative video games that can teach as well as entertain. In one game designed by Barab, the player assumes the role of an investigator seeking to find out why virtual fish are dying in a virtual park. Various theories are offered such as excessive logging or farm fertilizers, and the players share data about water quality and compare hypotheses. If they recommend kicking out the loggers, the park may go bankrupt, giving students a real-world dilemma.46

Some are advocating the use of classroom time for the purpose of teaching children how to build virtual worlds much like archeologists, engineers, and others do and to play games alongside others on the Web, like Second Life.47 Barab marvels at the skills her son has mastered from video games, but limits him to six hours a week, fearing addiction. "My 6-year-old, Julian, can step into a video game and a world of rules and figure them out. He's not scared of the unknown or scared of failing. I think that's

something valuable that video games provide. But, I want him to experience much more, and relationships outside of games," Barab added.48

HOM-S intends to use virtual world education and relate it to real world situations. For instance, in the virtual park fish scenario, the project would be further explored by having students perform pH tests on actual water samples that have had various types of fertilizers added to them. The use of interactive technology will be a significant aspect of the HOM-S design.

PEBBLES

Achim Nurse is a 13-year-old boy who was bedridden at Blythedale Children's Hospital in Valhalla, New York. To help him keep up with his schoolwork and his friends for the months he was hospitalized, PEBBLES (Providing Education by Bringing Learning Environments to Students) used a pair of robots in the classroom—one, called Mr. Spike, and its mate, Mrs. Candy. The robot in the classroom, which displayed a live picture of Achim, provided what its inventors call "telepresence". It gave Achim an actual presence in the classroom that was recognized by teachers and classmates. It moved from class to class on its four-wheel base and even stopped at the lockers for between-period chats. Achim's teacher, Bob Langerfield, said his other students had become used to the robot—and were treating it as if it were Achim—after just a few days. "The robot literally is embraced by students in the classroom as though that is the

medically fragile student," said Andrew Summa, national director of the robot project, which is in use at six other hospitals around the country.49

This technology can be used for hospitalized students, suspended students or even to help young prisoners. "When you're in the hospital you're isolated, you're stuck here," said Jim Desimone, the traumatic brain injury coordinator at Blythedale. He adds, “You don't have friends, you don't have anything except maybe a phone call from home. You fall behind at school. With this technology you have social interaction, which is a part of school. Yeah, we could have a teacher come into his hospital room and teach him, but that's not the same." Contemplating the potential of this technology, Summa adds, "You can have a child hospitalized in New York City and his classroom can be in New Zealand. We can connect any two points around the world."50

The use of robots is outside of the purview of the HOM-S project, however there are important lessons here of connectivity in the service of delivering education and promoting social interaction, which will be explored and applied.

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Chapter 4  HOM-S CASE STUDY: LIBERTY CITY

SITE ANALYSIS

THE SCHOOL

In 1998 the state of Florida began to administer the Florida Comprehensive Academic Test in order to rate its primary and secondary public schools in accordance with the governor’s A+ Plan. The A+ Plan is meant to set high standards for student performance, measure and publicly report on that performance, and provide state assistance, rewards and sanctions. Schools that improve a letter grade or receive an A are rewarded with bonuses for teachers, enhancements to the school, or incentives for students. Schools that receive an D or F grade are put on an academic probation by the school board, giving the administration three years to bring the school's grade up to a C or higher. If the school is not able to achieve improvement in three years, then more drastic measures are taken. The case study site for this thesis is the area surrounding Holmes Elementary School and Liberty City Elementary School. These schools are F-rated schools on the brink of closure. Holmes Elementary School is located at 1175 NW 67 Street and enrolls to 372 students in Pre-Kindergarten to the 6th grade. Liberty City Elementary School is located at 1855 NW 71st Street and enrolls to 206 students in

52 Miami-Dade County Public Schools, Holmes Elementary School, http://holmes.dadeschools.net/.
Since 2004, Holmes and Liberty City Elementary Schools have received F scores repeatedly while their students have shown no signs of improvement. Due to these criteria, and in accordance with the A+ Plan, the schools were given a list of changes from which they could choose or be forced to close (as was suggested by the superintendent). The changes taken at Holmes and Liberty City included hiring reading, math and science coaches, increasing teacher training, appointing academic deans for the worst performing students, and finally in 2008, appointing new principals. Other options available to F schools, but not utilized by Holmes and Liberty City, are increasing the school day by 3 hrs, paying students to attend school on weekends and holidays, and increasing technology through the use of computerized classrooms and whiteboards. In some ways, these latest proposed changes reflect the primary differences between a
public classroom and the classrooms available at a private elementary school. The benefits of technology on education are well documented. Nevertheless, lack of technology may not be the largest concern.

The School Climate Survey is an annually administered survey distributed to approximately 83,700 parents, 41,100 elementary, secondary, and adult students, and 26,100 staff. Fifty-three percent of the parents, 82 percent of the students and 74 percent of the staff who were surveyed in 2008 responded. The survey is meant to gather information regarding what these groups think about their school and their perceptions concerning how their school can be improved. According to a 2007-2008 School Climate Survey administered by the Miami-Dade County Public Schools Research Services, classroom and school atmosphere is a leading reason for failure cited by students, parents and teachers. It should be noted that this result agrees with the thirty-one percent of homeschoolers whose parents said concern about school environment was their reason for homeschooling. When looking at the results of the surveys for Holmes and Liberty City Elementary, one key concern of the students is the presence of gangs and school violence. At Holmes Elementary, 69% of surveyed students cite gangs as a problem at their school, while 39% of Liberty City students cited the same problem. In addition, 76% and 62% of students attending Holmes and Liberty City respectively feel violence at

55 Miami-Dade County Public Schools, Annual Climate Survey, http://drs.dadeschools.net/SchoolClimateSurvey/SCS.asp.
their school is a problem. This high level of violence and proclivity towards gang mentality is one example of negative community identity.

In 1971, 15-year olds Raymond Washington and Stanley Tookie Williams, founded a gang known as the Cribs. They were called Cribs because of the young age of the majority of its member. Its sole purpose was to form a street alliance against street gangs. Eventually, the Cribs changed their name to Crips. Some accounts state that the name change was due to the pimp canes the members would walk with, while others believed it was an acronym for Community Revolution In Progress. No matter the historical account, the Crips became one of the largest and most dangerous street gangs in America, and became the problem they were tempting to solve. Eventually the Crips, once a uniform alliance became a loosely connected network of individual sets, often engaged in open warfare with one another. The history of the Crips speaks to the problems present in Holmes and Liberty City schools. The young citizens of Los Angeles sought identity, community and safety, and therefore formed the Crips. However, over time the organization became so large that the anonymity erased those initial benefits.

57 Miami-Dade County Public Schools. *Annual Climate Survey*, http://drs.dadeschools.net/SchoolClimateSurvey/SCS.asp.

The same can be said for the urban public consolidated school. According to the National Association of Secondary School Principals, large schools shroud young people in a “cloak of anonymity.” The re-establishment of positive community identity would be a key benefit to the students of Holmes and Liberty City Elementary Schools.

THE NEIGHBORHOOD

Liberty City (called Model City by the municipal government) got its name from the Liberty Square Housing Projects. Liberty Square Housing Projects were built in the late 1930s for Miami's low-income African-American population, and was the first of its kind.

kind in Florida. Presently the boundaries of Liberty City are NW 79th Street to the North, NW 27th Avenue to the West, NW 41st Street to the South, and Interstate 95 to the East. It is inhabited by 23,009 citizens of whom 94.69% are African American, 3.04% are Hispanic, 1.68% are non-Hispanic and 0.59% are White (non-Hispanic). The median household income in Liberty City is $18,887.49, which is approximately $5,000 below the general City of Miami median household income, and $30,000 below the US median household income.  

The site for this thesis is bounded by NW 71st Street to the north, NW 12th Avenue to the east, NW 62nd Street (Martin Luther King Boulevard) to the South, and NW 19th Avenue to the west. The total site is 240 acres or .375 miles. The area is

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60 City of Miami, *City of Miami Planning Department*, http://www.miamigov.com/Planning/pages/services/Census.asp.
predominantly residential with 17th Avenue and 62nd Street operating as commercial corridors. There are no parks or recreation areas located on site, but it is bordered by African Square Park on 62nd Street between 14th and 15th Avenue across from the original Liberty Square housing projects. There are also playing fields located at the neighborhood schools but they are not readily open to the general population.

PROGRAMMING ANALYSIS

The formation of the program and design of the solution should be influenced by the needs of the community. This section is an analysis of the dominant needs of the case study site.

The Pew Internet and American Life Project 2008 found that only 42% of American households making under $30K have broadband access.\(^{61}\) The median income of Liberty City is approximately $18K which puts the residents of Liberty City well below the margin set by the Pew Internet and American Life Project 2008. In addition, according to the National Adult Literacy Survey, which had a score range of 0-500, the mean scores of all African American adults on the prose, document and quantitative literacy scales were 43 to 63 points below those of White Americans while the White-Hispanic gaps were even larger, ranging from 67 to 75 points.\(^{62}\) These two facts coupled with the close proximity of two F-schools, proves the existence of a literacy gap in this


\(^{62}\) Sum, *The Twin Challenges of Mediocrity and Inequality: Literacy in the US from an International Perspective*, 22.
area, and establishes bridging the general literacy and digital literacy gap as a main priority of the solution.

Though positive role models such as Mary Athalie Range, the first African American to serve as a Miami commissioner, have come from Liberty City, Liberty City is better known for infamous characters such as for Philip Andre “Mickey” Rourke, Jr., Alvin “MVP” Burke, Jr., Chad “Ocho Cinco” Johnson and Maurice “Trick Daddy Dollars” Young. Interviews and the reputations of these individuals explain the social state of Liberty City as portrayed by the climate surveys taken at the elementary schools. Gang activity and violence are the norm. However the fact that the parents and staff seem to not see it as a problem, while the children have a completely opposite view, points to a gap between the home and society.

In a conversation with former Miami-Dade County and New York State superintendent Rudolph Crew, the issue of economic opportunity arose. During that conversation he asked a very poignant question: “As a child, as you walk up the streets of Liberty City, what do you have to aspire to? What places of employment or economic opportunity (positive economic opportunity) do you see? There is none.” This area is serviced by two main economic corridors NW 17th Avenue and NW 62nd (Martin Luther King Boulevard). This 1.25 mile economic corridor has no grocery stores or restaurants, though there are two dining establishments, Miracle Fry Conchfritter (7070 NW 15th Avenue) and Big Momma’s Soul Food (6831 NW 15th Avenue) located within the boundary of the site. There are many empty lots, and when compared with other City of

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Miami economic corridors such as Coral Way in Coral Gables, there is an apparent lack of economic investment. Coupled with the fact that the median household income in Coral Way at $37,168.89 is approximately $20,000 above, or more than double, the median household income of Liberty City, bridging the economic gap is imperative.64

Solving the predominant social, literacy and economic gaps will drive the program and design of the solution. The proper solution should not only positively affect the physical environment by repairing the urban fabric, but it should also improve the value of the academic services provided. It should neutralize negative effects and create positively evolving communities, growing municipalities and a competitive nation. In

short, the solution should be a form of school building. The re-established schools should create positive learning environments that educate intelligent, productive citizens who will positively influence society. Since our standards are declining, while our global neighbors’ standards are advancing, the challenge is great. We can meet this challenge by developing approaches to education that provide both a competitive standard level of education as well as a personalized, goal inspired curriculum. The solution should also require a light handed execution with profound results. In addition, there is a need for a high level of flexibility, most likely afforded by the use of digital technology.

This solution will be called the HOM-S solution. HOM-S™ is not an acronym. It is a branding for the modular architecture that will be used to bridge the gap between the “hom”e and the “s”chool. The HOM-S solution will be a two phase process which first involves setting up a digital network, and then creating a network of physical nodes around which the community can center itself.
The school is not embodied in one building. Instead it is an education path that includes the home, the HOM-S and the consolidated school. These paths overlap as individual education needs overlap, intersect, and form networks. In congruency with the HOM-S mission to be a non-intrusive, plug-in solution, the design of the HOM-S network begins with the creation of the digital network. The first step is to place a wireless fidelity (wi-fi) network over the neighborhood using infrastructure already in place. Free wi-fi is an increasingly popular public service being offered. In San Francisco, the office of Mayor Gavin Newsom, in partnership with AT&T and Meraki, Inc., has promoted an initiative called “Network of Community Networks” since 2008. This initiative is meant to cover San Francisco with free Wi-Fi 2.0 service, but more interestingly, it is meant to be first implemented for the benefit San Francisco Housing Authority.65 For example beginning in January 2009, free wi-fi has been offered in the Sunnyvale housing development. According to the San Francisco Chronicle, Sunnyvale is “quite possibly the most dangerous, depressed and decrepit area of the city”.66 The hope is that by providing in-home broadband internet access to the residents of low income-housing developments, they will have more access to crucial information such as financial opportunities, jobs, and education resources. Although it is too soon to gauge


the success of the Sunnyvale Wi-fi Project, it is a suitable prototype on which to build the HOM-S design.67

One of the greatest amenities of the thesis site is its access to public transportation. Four bus lines service this area, linking it to neighborhoods with similar demographics as well as the museum district, hospital district and main branch of the Miami library system. The bus line represents the first phase of the physical network. The connections to the Main library, Vizcaya Museum and the Miami Art Museum represent access to information and increased literacy. The connection to neighborhoods such as Overtown, Allapattah, Coconut Grove, Hialeah and Opa-Locka is a physical network connection that can be used to bridge social gaps in the greater community.

Lastly, the bus lines run predominantly on the commercial corridors. In addition to connecting to business districts such as Biscayne Boulevard and downtown Miami, the access to commercial zones as well as the constant flow of potential customers, makes the bus stop a viable location for economic improvement. For these reasons, the bus stop is seen as a gateway or portal through which information access, economic exchange and social interaction can be facilitated and enhanced.

HOM-S network wi-fi broadcasters are to be added to existing Miami-Dade County Transit bus stops. Every bus stop is equipped with a 10-foot pole which displays a map and schedule for the bus routes which use that stop. HOM-S network wi-fi broadcasters are secured to the top of these poles. The typical specifications for a HOM-S wi-fi broadcaster are equal to or greater than RadioLabs 2.4 GHz 11 element yagi antenna. This antenna is outdoor ready, only 2’ in length, within the $50-$75 range and has a 1mile+ range. The antenna will be installed at half-mile intervals for the purpose of overlapping individual antenna effective ranges. The HOM-S network uses mesh networking similar to the one used in Sunnyvale. Mesh networking is a way to route data, voice and instructions between nodes. It allows for continuous connections and reconfiguration around broken or blocked paths by “hopping” from node to node until the destination is reached. Because it can hop around blocks in the system, the mesh network is self healing.

All students will be supplied with One Laptop Per Child (OLPC) XO laptop computers, which operate naturally on a mesh network. Designed to create educational opportunities for the world’s poorest children, the XO is rugged, low-cost, and low-power due to its rounded edges, integrated kid-sized handle, and sealed, rubber-
membrane keyboard. The XO is about the size of a textbook and lighter than a lunchbox, and thanks to its flexible design and “transformer” hinge, the laptop easily assumes any of several configurations: standard laptop use, e-book reading, and gaming. The student will carry the laptop along the education path. It should also be noted that the netbook is one of the fastest growing segments of the computer industry.68 By providing children with this technology, they are more familiar with the technology they will be using in future work environments.69

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In addition to encouraging communication between students, the HOM-S network is designed to accumulate data as well. Site specific projects conducted in different locations and other opportunities afforded by cluster processing require the need for equipment to store massive amounts of data. Cluster processing is the practice of using a group of linked computers to perform tasks as though they were a single computer. The result is improved performance, availability and cost-effectiveness over that provided by a single computer of similar speed and power. The cluster is a digital version of the democratic society. It is a group brain. The consolidated school is the embodiment of society, and is the forum for communities coming together for competition and collaboration. For that reason, all servers for the HOM-S network will be housed at the consolidated school. These buildings are equipped to handle the HVAC requirements necessary to keep data farms operable. In addition, the displacement of certain activities to HOM-S nodes and students’ homes relieves space within the consolidated school building. These factors make the consolidated schools excellent sites for HOM-S network data servers.

**HOM-S PHYSICAL NETWORK**

The two major trends in schooling – homeschooling and consolidated schools – point towards two extremes. One deals with grouping students into larger populations and through economy of scale providing “better to more”. On the other end of the
spectrum, homeschooling allows for personalized, safe childhood education more aligned with family views and goals. The HOM-S solution is not embodied in one building. Instead it is an education path that includes the home, the HOM-S insertion (otherwise called HOM-S) and the consolidated school. These physical paths overlap as children travel between buildings, and transform the neighborhood into a community.

Over the past few decades, obesity has been on the rise amongst American children. Among that group, African American children between ages 6 -17 were 1.3 times as likely to be overweight than Non-Hispanic Whites. HOM-S is meant to be a proponent of a healthy lifestyle. Originating at the bus stops and schools, which represent points of destination, reasonable walking distances will be used to determine

placement of HOM-S. According to the Congress for New Urbanism, a reasonable walking distance is ¼ mile (5mins). Due to the size and age of the children using this network, 1/8 mile interval placement of HOM-S is optimal. Nevertheless, assuming the use of bicycles, scooters, Segways™ and other single person vehicles will occur, the HOM-S will be at a maximum interval of ¼ mile. In conclusion, the placement of HOM-S is determined by two factors. The HOM-S must be within ¼ mile distance of the portals to the community – bus stops – and they must be placed on vacant or underused lots within the community. These lots will be leased by the city. By not purchasing, but rather leasing the properties, the city partakes in improving the community economically while leaving the ownership of the real estate in the hands of the community.

**HOM-S NODE**

The HOM-S is a contemporary, low-population learning environment. According to Beaumont, education experts believe well designed schools typically have the following populations: 300-400 students for elementary school, 500 students for middle school and 1,500 students for high school.71 Each HOM-S will be centered on a smaller community, and for that reason the population of a HOM-S will be 15 students total.

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This is a small gathering place which provides entry to the learning environment. Its main characteristics - open, covered and facing the street - make it a shared realm between the HOM-S learning environment and the neighborhood. This is where parents wait to pick up children, children wait as the teacher prepares the classroom, or after hours, where the elders play checkers or dominoes.

This enclosed area is characterized as a “place of display” and its walls are oriented to achieve this purpose. The southern wall has low windows which allow fresh air to flow into the space as well as allow views outside for children laying on the floor. The upper portion of the wall is an open surface for displaying child work, maps and other pinned-up items. The fenestration decreases the amount of sunlight which would negatively affect the legibility of video displays while still permitting natural light which is proven to be beneficial for productive child learning. The eastern wall is used by the video projector to display relevant documentaries and other animated presentations. The northern wall has a series of windows which allow air to flow out of the space as well as allow views outside for children standing. The western wall faces the street and allows views of the children and video projected material by the neighborhood.

The core contains the secondary means of egress, bathrooms and storage which can be converted to a kitchen area.

This enclosed area is characterized as a “place of interaction”. Its fenestration logic is similar to that of the “place of display”. The western wall is equipped with a touch sensitive, video screen. It also has a camera for recording video. Because site specific learning will occur in the HOM-S, this equipment is oriented towards the back of the site for the purpose of displaying the progress of site specific projects such as the Farmer Jack Project.

This open, covered area is a staging area for projects which are messy or need a controlled outdoor environment. It is also a place for more private community gatherings such as a wedding reception or birthday party.

This is the parking area for personal transportation vehicles such as scooters, bicycles, skateboards and Segways™.

Figure 4-10 HOM-S node guidelines.
Figure 4-11 Place of display.

Figure 4-12 Place of interaction.
HOM-S CURRICULUM AND ADMINISTRATION

Curriculum and staffing of the HOM-S is critical to facilitating the use of the HOM-S network as an education path that includes the home, the HOM-S and the consolidated school. According to a Pew Forum on Religion & Public Life survey released in February 2008, 83.1 percent of Americans affiliate with some form of religion. Nevertheless, religious studies are not allowed in the public schooling system. This gap between culture and society offers an opportunity for the creation of a curriculum which benefits from the HOM-S solution.

SUBJECT BASED CURRICULUM

Specialist taught subjects comprise the dominant form of curriculum in today’s consolidated schools. Considering the HOM-S solution is a non-intrusive, plug-in solution, a subject based curriculum that links the home to the consolidated school is required. Belen Jesuit Preparatory School is a nationally top rated school located in Miami Dade County. Their 6th grade curriculum was chosen because it contained a variety of subject areas including disallowed public school subject areas (i.e. theology), amenity subject areas (i.e. foreign language and computers) and staple subject areas (i.e. mathematics and reading). The subject areas are Theology, Reading, Computers, Language Arts, Foreign Language, Math, Social Studies/Civics, Science, Fine Arts (Music), and Athletics. Based on issues of economy of scale, expressed preference through homeschooling surveys and desired class size, the curriculum has been spread

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out along the education path. Due to the personal nature of Theology and Reading, these subjects will occur in the home. Computers, Language Arts, Foreign Language, and Math lend themselves to small groups so they will occur in the HOM-S. Broad access, safe use and secure storage of hazardous materials, expensive technology and equipment makes the consolidated school the proper site for Fine Arts, Science, Social Studies/Civics and Athletics.

**SITE SPECIFIC CURRICULUM**

Some subjects cannot be easily relegated to one building versus another. The different branches of a subject such as science may be taught better in different locations with varying class sizes. Each HOM-S can have a character and focus of its own to accommodate the different scales and subjects of learning. Like Prairie Crossing Charter School which focuses on hands-on environmental education, the schools can pull part of
their curriculum from nearby sources, while other parts of the curriculum can be pulled together from distant, virtual sources. For example, complex chemistry lessons which require supplies be safely stored, distributed and utilized, would be better suited in a central location such as the consolidated school. However, a site that is near a pond might be better suited for the study of ecology or marine biology and the study of single cell organisms. The same can be said for a HOM-S sited near fertile soil. The same can be said for a HOM-S which has been sited near a commercial corridor. These projects can be given child friendly names such as the Farmer Jack Project (agriculture), the Fishbowl Project (marine biology) and the Lemonade Stand project (entrepreneurship).

Projects conducted in various locations can share data. For instance if two HOM-S, one in Massachusetts and the other in Florida, are both doing the Fishbowl Project, they can focus on largemouth bass. During the project, they can use the “place of interaction” to exchange information concerning the fish growth as time progresses and the weather changes. In addition, these projects can become franchises that are equipped with the dual task of educating while providing economic opportunity for their communities. In Liberty City, the Farmer Jack Project can focus on horticulture and agriculture. Part of the outside area can be used to grow corn while another portion can be used to grow orchids. Once full grown, these plants can be sold locally or exported and the funds used to benefit the community.

73 Congress of New Urbanism, More Valuable Perspectives from the CNU Schools Summit (Chicago: Congress of New Urbanism, 2007), 15.
The role of the teacher in the HOM-S solution can be divided into two categories – the source of knowledge and the “dispenser of knowledge”. The “source of knowledge” is a specialist concerning a particular interest. Previously, the best specialists would be accessible only by attending the schools where they taught, which in many cases would be those outside of the public school system. With the evolution of distance learning technology, the specialist is capable of reaching a larger group of students. The specialist can distribute information, perform live presentations and answer questions through the HOM-S network. In addition, specialists can communicate with specialists in other locations and exchange data that may aid them in their own personal research.

The other role, the “dispenser of knowledge”, does not need to be a specialist in a particular field, but rather is more likened to a librarian. The librarian is an expert of research. The fast evolution of search tools and the increased networking of data, suggests a growing appreciation for the skill of being able to direct a student towards the right source. In addition, in places like Liberty City, the literacy and economic gaps are not limited to the younger generation. The HOM-S envisions a cross generation relationship in which the older generation acts as the “dispenser of knowledge” and authority figure, while also gaining knowledge in the topics they find interesting. This authority figure is best played by adults who command a high level of respect and familiarity within the neighborhood, and have a continuing education goal of their own. In this way, the HOM-S solution will operate as a community learning center.
Chapter 5 CONCLUSION

RESULTS AND ANALYSIS

This thesis set out to discover ways low population learning environments could be networked into the urban fabric of a blighted neighborhood for the purpose of improving its academic performance. During this research, it became apparent that the failing academic performance of two schools in Liberty City could be linked to, and were exasperated by, literacy, social and economic gaps. The result was the development of a two phase process. The first phase includes creating a digital network to provide access to information for Liberty City residents. The second phase includes setting up guidelines for a building type which is conducive to both digital learning as well as traditional hands on learning. Next, vacant lots are occupied with a design based on those guidelines for the purpose of setting up an education path between the home, HOM-S and consolidated school, in order to convert the neighborhood into a learning campus. Lastly, the home, HOM-S and consolidated school are tied into the digital network for the purpose of gathering, storing and exchanging data. Through these phases, the network is able to not only provide access to information for the purpose of improving the academic performance of the children in the neighborhood, but also it is able to provide increased economic and social opportunities to all residents.

POLICY IMPLICATIONS

The HOM-S solution cannot be implemented in today’s environment without certain changes in policy and support from a variety of institutions. The Board of Education would have to extend the boundaries of the school to include the HOM-S and
their surrounding areas for the purpose of budget, safety and maintenance. The Board of Education would also need to change the definition of the teacher to include the “dispenser of knowledge” role. In addition, the American Institute of Architects and its members would need to research and produce a set of guidelines defining the HOM-S typology based on regional needs. Lastly, because of its many programmatic uses, municipal and state zoning laws would have to be adjusted to allow for the construction and function of this multi-use typology.

**Future Research**

The HOM-S solution focused on education in America through the field of architecture, urban design and technology. Many social, educational and political issues fell outside the scope of inquiry. Because of these limitations, future research would include the following. There must be a survey of areas, like Sunnyvale projects in San Francisco, where wireless access has been implemented. The survey should seek to determine if the students in that area have improved their grades and if the adults in that area have had greater economic success.

There is also future research required in terms of technology. The HOM-S solution intends to use the latest digital technology including wireless networking, cloud filing, learning games, kindle libraries, whiteboards, video communication and cluster processing. There needs to be more in-depth research as to the cost of building and using these technologies. In the case of Miami-Dade County, the technology budget in an F school is equal to $1000 per student. The hope is to fall beneath this margin.
Lastly, the HOM-S solution was implemented using a subject based curriculum. This is the predominant form of curriculum in today’s education system. However, the HOM-S solution is a flexible system which would be best suited with an education system with the same characteristics. The integrated curriculum would allow for a more democratic, personalized syllabus to be devised by the HOM-S administration and student body.

CONCLUSION

This thesis set out to investigate ways low population learning environments could be networked into the urban fabric of a blighted neighborhood for the purpose of improving its academic performance. In the end, it discovered a variety of links and gaps in the community which contributed to its state of blight. It was limited however in the scope of its research because of a lack of expertise and contribution from other relevant fields. Notwithstanding these limitations, it was able to demonstrate ways of bridging those gaps and improving the neighborhood and its residents.
APPENDICES

JOURNALS, STUDIES AND REPORTS

ETS- Educational Testing Service

Educational Testing Service is the world's largest private educational testing and measurement organization and a leader in educational research. The company is dedicated to serving the needs of individuals, educational institutions, and government bodies in almost 200 countries. ETS develops and administers more than 12 million tests worldwide.

Traditionally, ETS's primary purpose has been the development of tests and other assessment tools to provide information (including test scores and interpretative data) to test takers, educational institutions, and others who require this information. ETS is now poised to broaden its scope beyond the U.S. measurement space into the worldwide education and training space.

By building on existing capabilities, ETS is increasing its presence in certain education markets (K-12, occupational testing and training, and the international arena—Europe, Asia, and Latin America), allowing the organization to offer a broader array of assessments, ones that focus on placement, instruction, and adherence to standards-in addition to those that focus on selection and licensing.

ETS also operates two subsidiaries; Chauncey Group International (www.chauncey.com) the leading provider of certification and licensing examinations for professionals, businesses and government agencies; and ETS Technologies, Inc.
(www.etstechnologies.com) that identifies, develops and deploys innovative technologies in support of online learning and assessment applications.

IALS- International Adult Literacy Survey

The International Adult Literacy Survey (IALS) was a collaborative effort by seven governments and three intergovernmental organizations. This survey reports the results of a wide-ranging test of literacy skills given to a large sample of adults (ranging from 1,500 to 1,800 per country) in Europe and North America in fall 1994 and in additional countries in Europe and Australia in fall 1995, for a total of 12 countries.* Each country was required to draw a probability sample from which results representative of the civilian, non-institutionalized population aged 16 to 65 could be derived. In nine countries, the survey was carried out in the national language; in Canada, respondents were given a choice of English or French; in Switzerland, samples drawn from French speaking and German-speaking cantons were required to respond in those respective languages; and in Belgium, only the Flemish-speaking communities were tested IALS online.

NALS- National Adult Literacy Survey

The Adult Education Amendments of 1988 required the U.S. Department of Education to submit a report to Congress defining literacy and measuring the nature and extent of literacy among adults in the nation. To satisfy these requirements, the National Center for Education Statistics (NCES) and the Division of Adult Education and Literacy planned a nationally representative household survey to assess the literacy skills of the
adult population in the United States. In September 1989, NCES awarded a four-year contract for that purpose to Educational Testing Service (ETS) with a subcontract to Westat, Inc., for sampling and field operations.

The National Adult Literacy Survey is the third and largest assessment of adult literacy founded by the Federal government and conducted by ETS. The two previous efforts included a 1985 household survey of the literacy skills of 21- to 25-year-olds, funded by the U.S. Department of Education, and a 1989-90 survey of the literacy proficiencies of job seekers, funded by the U.S. Department of Labor.

**NAEP- National Assessment of Educational Progress**

The National Assessment of Educational Progress (NAEP), also known as "the Nation's Report Card," is the only nationally representative and continuing assessment of what America's students know and can do in various subject areas. Since 1969, assessments have been conducted periodically in reading, mathematics, science, writing, U.S. history, civics, geography, and the arts.

Under the current structure, the Commissioner of Education Statistics, who heads the National Center for Education Statistics in the U.S. Department of Education, is responsible by law for carrying out the NAEP project. The National Assessment Governing Board, appointed by the Secretary of Education but independent of the department, sets policy for NAEP and is responsible for developing the framework and test specifications that serve as the blueprint for the assessments.
NAEP does not provide scores for individual students or schools; instead, it offers results regarding subject-matter achievement, instructional experiences, and school environment for populations of students (e.g., fourth-graders) and subgroups of those populations (e.g., female students, Hispanic students). NAEP results are based on a sample of student populations of interest.

(http://nces.ed.gov/NATIONSREPORTCARD/)

NCES- National Center for Educational Statistics Elementary / Secondary

The NCES survey program at the elementary/secondary education level provides information on the condition of public and private education. Through the Common Core of Data (CCD) survey national, state, and local data on public elementary / secondary education is collected. Important additions to NCES' data collection programs in the last decade include the Schools and Staffing Survey, the Private School Universe Survey, and the National Household Education Survey.

International

Insights into the educational practices and outcomes of the United States are obtained by comparing them with those of other countries. This is achieved through the International Education Statistics program at NCES, which provides statistical information comparing the educational experiences and trends in other countries to those of the United States. NCES carries out a variety of these activities to provide statistical data for international comparisons of education.

(http://nces.ed.gov/NATIONSREPORTCARD/)
TIMSS- Third International Mathematics and Science Study

The Third International Mathematics and Science Study (TIMSS) and Third International Mathematics and Science Study-Repeat (TIMSS-R) are the result of the need in the American education community for reliable and timely data on the mathematics and science achievement of our students compared to that of students in other countries. TIMSS, conducted in 1995, involved 42 countries at three grade levels and was the largest, most comprehensive and rigorous assessment of its kind ever undertaken. In 1999, TIMSS- R collected data in 38 countries at the eighth-grade level to provide information about change in the mathematics and science achievement of our students compared to those in other nations over the last four years.
REFERENCES


