Education of a the Citizen Architect through Designing Mobile Health Clinic Concepts

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Abstract

There is a difficulty in being critical of work done in the name of humanity or sustainability, but this taboo is being addressed in many architecture schools head on. The discipline of architecture also has a long tradition in "making," a legacy that dovetails easily with public services. This paper will demonstrate the modest, yet I believe productive ways, I aim to prepare architecture students to serve as stewards for our communities.

The specific project explored here is an example of the possibilities for architects to serve a greater range of clients and learn how to build a more sustainable world. The design team consisted of collaboration between the American Cancer Society (ACS), a video producer and my architecture design studio to analyze the need to provide quicker health care, and to brainstorm possible solutions to the ACS needs. I conceived of this studio collaboration as an opportunity to put architecture students in the position of problem identifier, rather than simply problem solvers. The project was twofold: first to provide an educational experience for the students using real world issues and second to provide the ACS with some concept designs to provide better emergency care while enabling them to solicit funding.

Introduction

Public awareness of the importance of design beyond mere consumerism and style is rapidly growing, and design is now an equal partner with many enterprises, including business, medicine, science, technology and urban planning. This point of view became forefront immediately following hurricane Katrina, when not only the design community, but also health care personnel were totally unprepared for immediate human needs.

Why weren't we better prepared?

Southerns claim it was a slow disintegration within the city that became clear about 25 years ago when our lack of commitment to the cities infrastructure allowed developers to gradually turn New Orleans into a theme-park. If you look at government policy, this was a result and an outgrowth of the campaign against "big government" that helped propel Ronald Reagan to the presidency. Much of the cities growth was left to private developers rather than public

policy. Essentially, living for short term benefits rather than planning for a “rainy day”. Most NoLa residences claim that the destruction of New Orleans is a warning for us to look within our own cities and hence the country as a whole. Such cynicism has been reinforced by the government’s disastrous response to the storm.

However, we all feel somewhat responsible or simply helpless during disastrous times. They happen suddenly and usually by surprise. What can we do better next time?

The world today faces challenges of unprecedented scale and complexity—including urban congestion, depleted natural resources, housing shortages and crises in healthcare. Solutions to these challenges increasingly require collaborations offering diverse approaches and perspectives. Because mankind lives in a designed world, designers are pivotal to the success of these collaborations.

During a school studio project, students worked as an interdisciplinary team with professionals to research for the American Cancer Society some of these issues. The project was twofold: first to provide an educational experience for the students using real world issues and second to provide the ACS with some concept designs to provide better emergency care while enabling them to solicit funding. (Please note that the ACS is a volunteer-based organization.)

Prototypical Knowledge

It became clear that after Hurricane Katrina, the ACS needed emergency mobile cancer clinics and the region also needed a range of temporary, transitional, and satellite clinics. In some cases adding an extension to an existing clinic could be as effective as adding mobile services. Privacy, security, staff retention and a host of other issues impacted the ideal clinic design.

In addition to providing testing, treatment and awareness education to underserved populations, a network of easily deployable mobile clinics equipped with satellite communications systems could provide critical information to central health care centers in order to track prevalence rates in outlying regions, assess the needs of specific communities and deploy limited resources accordingly. In the future, such a network could also play a vital role in distributing chemotherapy, antiretroviral drugs and eventually a vaccine.

Through various research exercises it was decided to design prototypes to assist the ACS in providing emergency response care during natural disasters. We felt once a prototype was built and tested in the area that we could gain knowledge to further refine the design.

Education and Stewardship, or Educating Citizen Architects through Community Involvement

Early in their education, Architects should learn to think socially responsible by creating architecture that can function as a tool. For us, while creating a mobile health care unit for

the American Cancer Society, we stressed that the realization of a built object was not the focus. Students began to learn that architecture was not an end in itself, but can provide a need for the forgotten or underserved. The goal was the creation of a social architecture understanding the 'social' and the 'economic' and then use architecture within this larger socio-economic framework to bring about the desired change or result. Students, maybe for the first time, began to realize that if architects are to act as leaders in our communities, we must take on the role of a social activist and speak for those who are never heard.

During an introductory powerpoint to students on the subject, we started with a quote by Carol Mockbee, who reflected on her father Sam Mockbee's famous Rural Studio's work:

> *My father always said that he was an artist, an educator, and an architect---in that order. He realized that a title was only as valid as the conduct that accompanied it. He encouraged me and others to embrace the opportunity to augment our own titles toward a more meaningful end. His challenge for us was to closely examine our own actions, to see if we could improve the status quo that dictated our roles of student, teacher and citizen. He wanted us to move outside the privileged establishment and into the reality of people who are denied social mobility.*
>
> *Long before my father conceived of the idea for the Rural Studio, he was designing low-income housing in our hometown community of Canton, Mississippi. For him, it was a natural responsibility. For others it was a novel idea. For the families who benefited from his efforts, it was a new existence. It should not have been an uncommon act. It should be required. We cannot rely on others to change the way the world perceives our roles. It is up to us---artists, architects, designers, social workers, contractors, constructors, community planners---to take action for what we know is right.* [1]

During this project the students were not only exposed to health care providers, but also materials research, and research methods in general, in a more comprehensive manner than other design projects. They have benefited from a hands-on experiential type of teaching by working with a video producer, health care professionals and American Cancer Society volunteers, which emphasized the importance of being rooted in communal, social, and environmental concerns. Every stage of the project was founded on exhaustive research that addressed the areas of healthcare, disaster relief, social and cultural studies, prefabrication, and research of medical work environments. Faculty and students compiled this research (through a series of individual research projects), which was carefully documented and then edited for a series of paper conferences. Students were actively involved in the preparation of these submissions—an under-explored practice in the undergraduate teaching of architecture.

This educational approach, including social research with the studio framework is rare for architectural schools, where typically the research part of the project is very brief and not clearly structured, and the design phase dominates the process. The impact of this approach informed the future work of the students involved in this project (approximately fifteen 3rd year students), and especially for their thesis-year project, where students begin to do their own research to inform their individual projects.

Process and Participants

The American Cancer Society (ACS) is a nationwide community-based voluntary health organization dedicated to eliminating cancer as a major health problem by preventing cancer, saving lives, and diminishing suffering from cancer, through research, education, advocacy, and service.

Most importantly, the ACS is an advocate providing education to the public, and the government.

- **FACT:** The federal government is the nation's largest funder of cancer research.
- **FACT:** Insurance companies begin covering many cancer screenings - like mammogram, colonoscopies and PSA tests - because the American Cancer Society helps get laws passed requiring them to do so.
- **FACT:** More than a dozen states and thousands of communities are now smoke-free as a result of advocacy.

These are just a few reasons why cancer is not just a medical issue; it is a political issue as well. From the local city council to the U.S. Congress, the American Cancer Society is engaged with elected and appointed officials to ensure that cancer remains a top local, state and national priority. Through advocacy, together we can be successful in eliminating suffering and death due to cancer.

But, during Hurricane Katrina the ACS was ill equipped to help out during the early repair stages. Hospitals were closed, patients were separated from their families, disoriented and oftentimes did not know the exact chemotherapy treatment they were receiving. Upon reflection, how can we do this better next time? Was one of the first questions the ACS asked their board and volunteers.

As a result of these questions and concerns, we were hired by the ACS for a one-week assignment to create an in-house video to educate the ACS volunteers on how to help during a catastrophe like Hurricane Katrina. The ACS realized they were grossly unprepared during Katrina and that cancer patients were not able to receive care or information. A two-person video production crew, along with Otto my 126-lb rottwieller puppy, spent a week in Louisiana and Mississippi just three weeks after the storm hit.

First and foremost we were asked to help and follow ACS employees connect with patients that were stranded in their homes and left in shelters without access to treatment. We started by doing a series of interviews with cancer patients and doctors who were displaced as a result of Katrina: relocated chemo patients, those staying in shelters, etc. It’s shocking to realize what slips through the cracks during difficult times—what happens to someone who is unable to continue with chemotherapy for a period of time? Where are they?

We got deep into New Orleans Parish well before it opened to its residents. It was surprisingly easy getting through the armed blockades. All you needed was a reason and

some southern charm. With almost a numbing, rubber-necking excitement, we ventured in… What we found was horrible and very eerie. First off, I have never been in a city where there was little to no human life. We could only hear the occasional helicopter and sad sounds of animals howling. The entire area looked like it was covered in volcanic ash as a result of the mud and water. There was a continuous water-mark acting as an 8-foot horizontal datum drawn completely around the city leaving a memory of the flood—think, ring around the collar. Military were in boats looking for any remaining people and medical volunteers were breaking into houses to pull bodies out. The smell was indescribable and breathing was difficult. It was hard not to count the numbers spray-painted on individual buildings and deciphering the nomenclature.

Figure 1: Documenting the affects of Katrina and also creating an in-house video to educate the ACS volunteers on how to help during a catastrophe like Hurricane Katrina. Everyone was unprepared.

Figure 2: An old folks home in Mississippi where many patients with cancer did not receive chemotherapy for almost two weeks and oftentimes unaware of what drug they were receiving.

We interviewed the president of the ACS just minutes before she went into a meeting with the (now) head of FEMA; a doctor from Baltimore who flew into the Katrina area to help in the make-shift hospitals; a nurse in New Orleans who has been in the hospital for seven straight days and nights sleeping at the hospital on a cot in the hallway because her house is gone; Our base camp was at the Gulfport, Mississippi ACS headquarter location and they were completely up and running with boarded up windows and a donated generator…and yet to there were many cancer patients unable to receive their chemotherapy and studies have shown that if you neglect your treatment after a certain period of time then the recovery can reverse itself. Time became a factor in our research and a possible solution was to develop prototypes for an emergency mobile clinic and to adequately educate patients to the treatments they are receiving.

After the video was delivered to the ACS, we suggested getting my architecture studio class involved to brainstorm ideas about building an emergency response mobile cancer clinic, but also to have other care available as well. During times that emergency care was not needed, the

mobile clinic could be used in the rural areas of Louisiana and Mississippi to give vaccines to children and to educate folk on how to deal with emergency care during a natural disaster.

Program and Parts: Design Criteria

Mobile units can prove invaluable assets during emergency situations. Mobile cancer clinics will probably not be engaged in first response efforts, but rather in the aftermath of an emergency situation (24-48 hours post event) specifically for cancer patients needing chemotherapy.

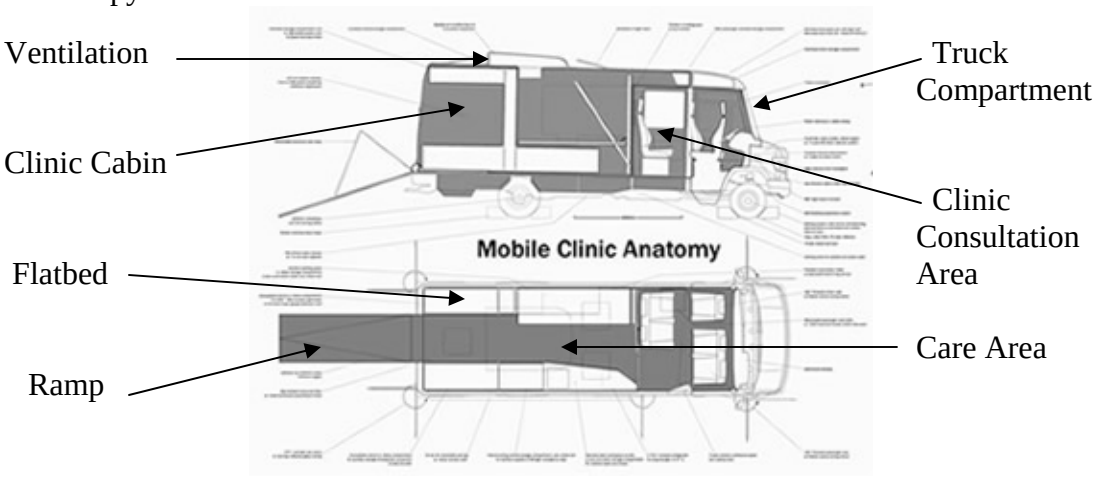

Figure 3A: Students were introduced to the parts of the Clinic through this 'mobile clinic anatomy' drawing [2]

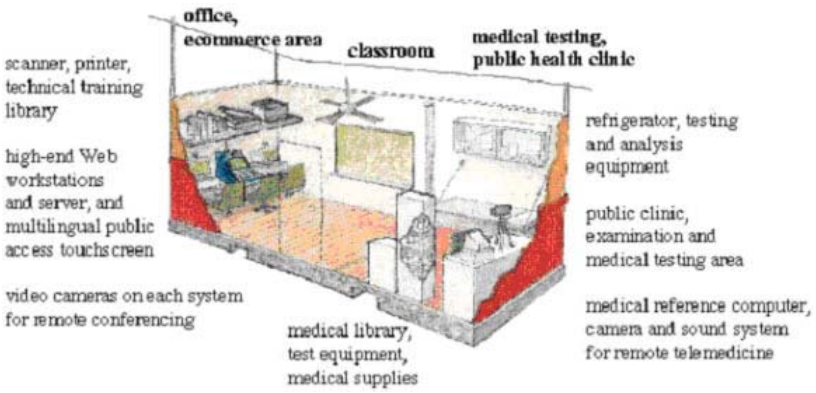

Figure 3B: Axonometric of the Interior Elements

The design workshop, or charrette represented a critical step in the development of the Mobile Cancer Clinic Project for the American Cancer Society. The Emergency Response MCC focused on ways mobile medical units can become an integrated part of local, state and national emergency response plans and on funding sources to support education and training for those

roles. Students worked in teams and began strategizing solutions. Ideas were initially worked out in quick concept models.

Once designed and built, these mobile clinics could be used not only by the ACS, but also by other relief and community health organizations to create a highly dispersed and effective network of care.

Figure 4: Weekend brainstorming session with students and professionals

We based our design criteria on the successful results of Architecture for Humanity's competition to create an AIDS mobile clinic to be used in the far reaches of Africa where AIDS is an epidemic (two entries shown below). Although some of the issues were similar, the mobile clinic for the American Cancer Society addresses emergency response specifically and its primary purpose is to provide chemotherapy to cancer patients displaced by hurricanes and other natural disasters.

Figure 5: Architecture for Humanity's competition entries to create an AIDS mobile clinic for Africa.[3]

With the students involvement and using the Architecture for Humanity's guidelines [4], six design criteria was established:

- **Criterion #1:**
  The unit should adequately house, transport and be easily operable by a small team of medical professionals (2 to 5). Storage of equipment and medical supplies should be

taken into consideration.

- **Criterion #2:**
  The clinic should be cost-effective. If possible it should be built using sustainable materials and construction techniques. Designers can make use of either advanced or simple technologies and should look to take advantage of local materials, construction techniques and labor.
- **Criterion #3:**
  The unit should be mobile and durable enough to be transported through a variety of places from city to rural areas. Topography and terrain should be taken into account. Ease of maintenance and repair are essential.

- **Criterion #4:**
  Design solutions should take into consideration the tasks performed within the clinic. The unit will primarily be used for the immediate needs of chemotherapy patients during emergency, such as after hurricane Katrina.

- **Criterion #5:**
  In addition to emergency care, the ideal design will take into account the varying health care needs of the population and should be easily adapted to treat these other diseases and conditions rather than sitting dormant and unused. Think about ways that the mobile clinic could also be used for prevention, testing and treatment of the virus and associated infections, and it can also be a place where health care professionals can teach and disseminate information.

- **Criterion #6:**
  Finally, the ideal design will also create opportunities for economic growth. Many of the regions surrounding New Orleans and Biloxi were deeply affected by hurricane Katrina and have suffered economically to the point of reverse development. In addition to becoming a highly dispersed health care distribution network, designers are encouraged to pursue ways of providing complimentary or secondary services in addition to health care via the same mobile unit.

From the above criteria, designs were proposed, but also other concerns. Ideas for the ACS Mobile Cancer Clinic prototype were designed to enhance the ability of hospitals and health care systems to prepare for and respond to natural disasters and other public health emergencies. Other program priority areas include interoperable communication systems, bed tracking, personnel management, fatality management planning and hospital evacuation planning.

Additional funding options was also researched and we found The *Pandemic and All-Hazards Preparedness Act* of 2006 (Public Law 109-417) amended section 319C-2 of the *Public Health Service Act* to allocate competitive grants to eligible entities in order to improve surge capacity and enhance community and hospital preparedness for public health emergencies. Optional funding capabilities included *Mobile Medical Assets*. While mobile

units did not receive priority funding, they were officially recognized as assets in emergency preparedness planning. The American Cancer Society would most likely have to funds for the prototype.

Project Outcomes

One team created the MOMO or Mobile Modules where modules expand to accommodate the needs of those being treated for cancer while protecting them from the elements. Each rigid module is 8.5 cubic feet and is equipped with stow away beds, medical equipment, or supplies. Each rigid cube is connected by an expander cube that can extend up to 13' for more space and flexibility among the users. Modules can be rearranged in a network configuration to accommodate mass quantities of patients.

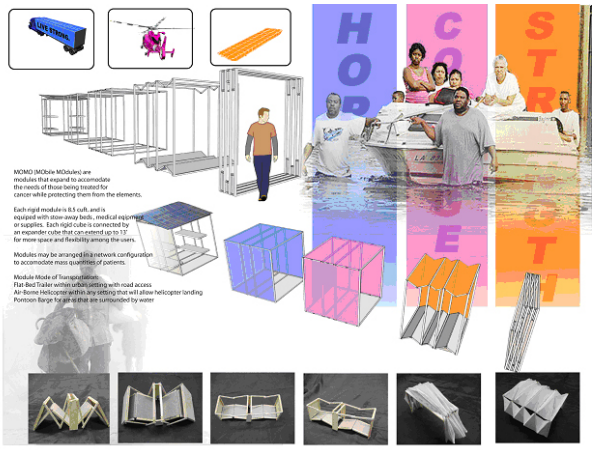

Figure 6: Proposal #1 by Southern Polytechnic 3rd Year Design Studio

Module modes of transportation: pick-up truck with flatbed trailer within an urban setting with road access; airborne helicopter within remote areas, and pontoon barge for areas surrounded by water.

Figure 7: Proposal #2 by Southern Polytechnic 3rd Year Design Studio

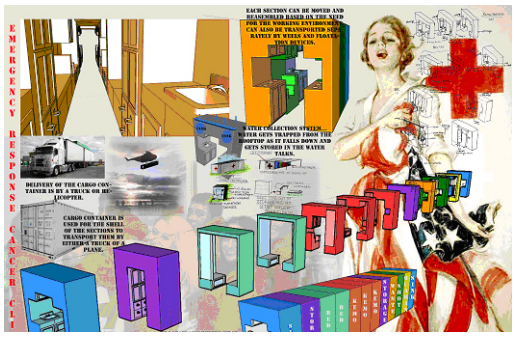

Figure 8: Proposal #3 by Southern Polytechnic 3rd Year Design Studio

Teams also researched and proposed an American Cancer Society Disaster Response System (ACS-DRS) and mapped out their core values and processes [5]:

Our Vision	Our Mission	Components of the Disaster Response System
ACS-DRS is a nation wide partnership embracing communities with world-class medical and emotional care in the wake of a natural or manmade disaster.	It is the mission of the Disaster Response System to design, develop, and maintain a national capability to deliver quality medical care to the victims of - and responders to - a domestic disaster. ACS-DRS provides state-of-the art medical care under any conditions at a disaster site, in transit from the impacted area, and into participating definitive care facilities.	▪ Medical response to a disaster area in the form of teams, supplies, and equipment. ▪ Patient movement from a disaster site to unaffected areas of the nation. ▪ Definitive medical care at participating hospitals in unaffected areas.

The ACS Mobile Cancer Clinic prototype enhances the ability of hospitals and health care systems to prepare for and respond to natural disasters and other public health emergencies. Current program priority areas include interoperable communication systems, bed tracking, personnel management, fatality management planning and hospital evacuation planning.

Figure 9: Prototype design to be used for further development

The wall section is conceived with an air cavity to help R-value and ventilation. Rapid and easy delivery and a workable assembly for the Mobile Cancer Clinic became an important

factor as well as having an identifiable character so that patients in need can easily find the clinic.

Hospitals, outpatient facilities, centers, poison control centers, EMS and other healthcare partners work with the appropriate state or local health department to acquire funding and develop healthcare system preparedness through this program. Funding is distributed directly to the Health Department of the State or political subdivision of a State (cities and counties are considered political subdivisions of States). The Goal guides entities at all levels

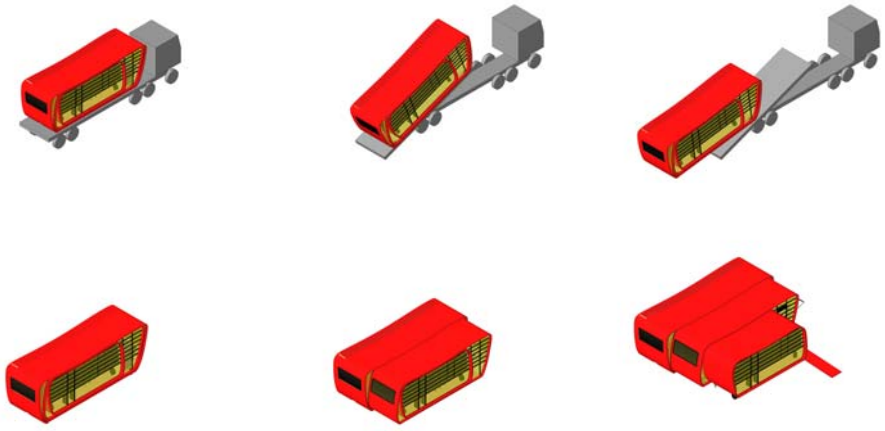

Figure 10: On-site Assembly Diagrams Step 1-7 with three telescoping compartments

of government in the development and maintenance of capabilities to prevent, protect against, respond to, and recover from major events, including Incidents of National Significance and natural disasters. Additionally, the Goal will assist entities at all levels of government in the development and maintenance of the capabilities to identify, prioritize and protect critical infrastructure.

Conclusion

There is more than one way to train citizen architects. Curricula need to provide multiple vehicles for learning about public and environmentally responsive design. For this intensive two-week design charrette, students were able to work with professionals in the health care and design fields that exposed them to diverse educational and professional experiences in a variety of disciplines from mobility and disaster-relief to biology and engineering. Together, they created an ambience in which varied aspects of design, planning, development, transportation, culture, economy and the environment are explored as one comprehensive entity within a framework provided by one of the world's most comprehensive professions: architecture.

Our design studio assignment was a small successful effort, one option in many. The concepts proposed to the American Cancer Society are a demonstrated form of stewardship. Mobile Clinics as artifacts of an architecture school's commitment to public service. Yet the far-reaching act is that of training young designers to be good stewards, for their communities and our environment.

Acknowledgements

The design concepts were sponsored by the American Cancer Society with the aim to solicit funds to design/build a prototype Mobile Clinic. I gratefully acknowledge my students Begnaud, Jake E.; Bell, Rodney A.; Bochenek, Jason A. ; Chong, Kevin M.; Fallin, Jonathan L.; Herrera, Luz A.; Le, Kennedy; Lu, Tietong; Norton, David M.; Papini, Giulia; Prestwood, Ried A.; Prowett, Kyri R.; Smith, Jereme A.; and Smith, Jeremy R. for their significant contributions to getting this project off the ground.

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Biography

ELIZABETH MARTIN is an Assistant Professor at the School of Architecture at Southern Polytechnic State University in metro-Atlanta; where she received the Outstanding Faculty of the Year Award 2008. Recently, she was awarded one of Atlanta's emerging voices by the American Institute of Architecture, which resulted in her participation in a group show at Museum of Design Atlanta (MODA). Liz received an NEA grant to edit a publication on socially responsible design work. She holds a Bachelor of Architecture from Tulane University and a Master of Architecture from SCI-Arc.