



Children at the Tamale Children's Home, May 2007.

The Ghana Project: The Global Engineer

By Katrina Myers, EI, Taylor Engineering Inc.

A baby girl cries as she squirms underneath her mosquito netting. Although she is only a few months old, her belly is already distended by malnutrition, and she burns up at night with the fevers of malaria. She lies on a threadbare blanket, unable to comprehend the challenges she will have to overcome. Her place of birth has determined the life she will lead. She has never tasted a drop of clean water; she has never heard the voice of a loving mother. She will likely become a woman without any resources, family, or healthcare if nothing is done. The sores and boils that crop up on her forehead and legs do not seem to bother the woman who cares for her. Small health issues such as these are unnoticeable compared to the diarrhea, malaria, and horrible cough she lives with every day of her short life. This is the life she shares with the 30 children at the Tamale (*pronounced: Tom-a-lay*) Children's Home in northern Ghana.



Ghana is a small West African country faced with both promise and challenge. After gaining independence

from the United Kingdom in 1957, many of Ghana's citizens struggled to gain many basic needs, such as clean water, basic sanitation, nutrition and shelter. Although the Ghanaian people continually work to improve their living conditions, their per capita average yearly income (GDP) of \$400 remains significantly under the poverty line.

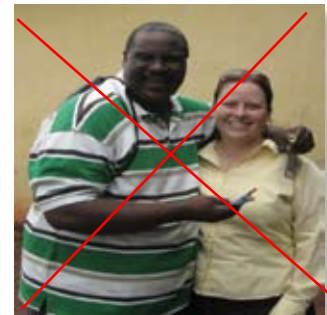
"Why can't this baby girl grow up with good health and ample opportunities? How can engineering help solve her problems?" These are the questions that University of North Florida (UNF) students ask. Since fall 2007, several UNF engineering students have become a part of these children's lives through an engineering service project. Their goal is to use their engineering education to enhance the quality of life for the children at the Tamale Children's Home through multiple health and safety improvement projects. The UNF School of Engineering established a partnership with the UNF Honors Program, which has taken students to Ghana for service learning projects since 2001. The engineering project began after a student, Katrina Myers, E.I., traveled to Ghana with the Honors Program in

May 2007. While there, she realized that engineering solutions could meet the needs of the Children's Home. The Tamale Children's Home Improvements became a UNF Civil Engineering Senior Capstone Design project and won first place in the Undergraduate Paper/Presentation competition at the UNF College of Computing, Engineering, and Construction Symposium in April 2008. In August 2008, Katrina returned to the Children's Home to evaluate the specific needs that this engineering project could address, as well as, to gather information about local technical resources that would be necessary for the design process.

mosquitoes breed. Also, the team will rescreen the buildings to keep mosquitoes from invading the children's sleeping quarters. The UNF students will create a vented location for the generator; in its current enclosed location, the generator creates toxic fumes that harm the children's lungs. By creating a garbage disposal system, the students will eliminate hazardous trash that litters the site. Most importantly, the students will establish a purification system for the rainwater that the Children's Home harvests from its roof. The UNF students also plan to replace and enhance the Home's current rainwater harvesting system, by re-piping, adding filtration, and replacing water storage tanks and their foundations.



Katrina Myers with Augustina Quainoo, the main administrator of the Tamale Children's Home and two of the older children.



Katrina Myers with Steve Tecku, the Tamale public works director.

Currently, the home is exposed to mosquitoes which carry malaria, the most deadly disease for the children. The student team will work to improve the stormwater drainage on site to eliminate the standing water where

The engineering implementation of the project will be coupled with an educational program that will inform the administrators of the Children's Home about good hygiene and health management. During the assessment

trip, Katrina discovered that many of the women who care for the children do not understand the severe health consequences of drinking unclean water. Along with a need for an educational program, there is a need for partnerships with the local resources. The Tamale Polytechnic University has agreed to partner with UNF. This partnership will not only foster sustainability of the project, but also facilitate cross-cultural interaction between American and Ghanaian engineering students. The Tamale Public Works Engineer, Steve Tecku, is extremely supportive of the project and has agreed to be a local liaison during design, permitting, and construction. Six students, two faculty members, and an Engineering Intern (E.I.) plan to join the Honors Program's May 2009 trip to Ghana to implement the planned improvements.



UNF Honors students installing a polytank at the Tamale Children's Home in May 2007.

Since this project's beginning, it has gained major support, starting first with faculty and then moving to the Jacksonville engineering community. Dr. Stephan Nix, the Director of the UNF School of Engineering, and Don Ditzenberger, P.E., Chairman of the UNF Engineering Advisory Council, have become avid supporters of the Ghana Project. Engineers Without Borders (EWB-USA), an engineering humanitarian organization, has recently adopted the project and will serve as a technical and cultural resource.

The widespread support for the Ghana Project proves that UNF and the Jacksonville engineering community truly value a new type of education for its up-and-coming engineers. They understand that the impact of the project extends beyond just the improvement of the Ghanaian children's lives. It puts a new method of educating young engineering students

into practice. UNF students have an opportunity to take their education not only outside of the classroom, but also across the ocean to a place that at first glance may seem unrecognizable and foreign, but upon deeper inspection, requires the same basic human needs as in America. The students will learn to analyze the technical situation, as well as, grasp the full impact that their designs may have on the children. This project provides an opportunity for the youngest members of the engineering community to gain real-world experience and to take ownership of a project with a scope beyond mere academic exercise. Students who work on this project will gain a sense of significance within their chosen field. Sean Corcoran, the 2008 – 2009 student leader, reflected on the preparations for his upcoming trip to Ghana by saying, "Through the Ghana Project, I have learned more about engineering than I have in the entire time I've spent in the classroom. To see how fortunate we are in this country and what can be accomplished with engineering has been an incredibly humbling and enlightening experience."

This experiential method of education creates engineers with knowledge that spills beyond the boundaries of the traditional engineering discipline, into a broader, global understanding that incorporates culture, public health, the environment, and the economy into engineering solutions. R. Bruce Taylor, PhD, PE, founder and CEO of Taylor Engineering and Chairman of the UNF Board of Trustees, has been very involved with the Ghana Project since its beginning. He believes that through the Ghana Project "we are instilling some core values at UNF, which will serve them [the students] well in their lives, no matter what they do. That shapes them as good human beings. You get your education in the classroom, but by going to Ghana, you are learning the tremendous value of public service, of helping others, of contributing your God given gifts of intellect and vitality to benefit others . . . with those kinds of values and perspectives, you will be a better engineer. You will serve your society; you will serve others, human beings, more effectively, and more productively because they all temper your judgment and your decisions. Often the decisions we have to make

as engineers are not technical; they are influenced by other things, by societal needs, social pressures, there is a whole suite of external influences that will impact every engineering project ever developed. Work to understand without judging...it will broaden your perspective."

Engineering has often been described as the "stealth profession." Dr. Taylor's personal mission is to bring more engineers into public service. He urges engineers to seek opportunities to serve on public boards. Currently underrepresented among policy makers, engineers should seek to apply their skills in the public arena. Dr. Taylor offers a simple formula for engineers who want to get more involved: "start small. You find something that you can help with, like the Ghana Project; you get involved, you give back, you serve your community. You volunteer your time. You meet people from other walks of life."



Jessica Watkins, UNF Honors student, holding a child at the Tamale Children's Home, May 2005.

Just as the baby girl can benefit from this project, so can UNF students, the engineering community, and society as a whole. Education is essential, whether it be to understand the importance of clean water to a child's health or to experience the needs within the field of engineering in a different culture. The Ghana Project makes a tangible positive impact on both the Tamale and the Jacksonville community. ■



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