Embracing innovation to address COVID-19 in Malawi

Teaser: The Malawi University of Science and Technology (MUST) is on the forefront of fighting COVID-19 with the support of Michigan State University.

The Innovation Garage at the Malawi University of Technology and Science (MUST) was designed to incubate creative solutions to local problems. As COVID-19 swept the globe, the Innovation Garage quickly responded by developing innovations to respond to local challenges presented by the pandemic.

The Innovation Garage grew out of the work of the Innovation Scholars Program (ISP) at MUST, which teaches faculty, administrators and entrepreneurs to develop innovations as well as a culture of innovation across a university. During the 24-month program, mentors from Michigan State University (MSU) and Lilongwe University of Agriculture and Natural Resources coach scholars of the program how to develop local solutions using human-centered design. The United States Agency for International Development (USAID) awarded MSU's Global Center of Food Systems Innovation (GCFSI) $1 million USD in 2018 to lead the Innovation Scholars Program.

The results of MUST's embrace of a culture of innovation became clear as the Innovation Garage pivoted to respond to the novel coronavirus. In mid-March, when much of the world was shutting down due to the novel coronavirus, MSU and the MUST Innovation Garage launched a call for proposals, encouraging faculty and students to submit their ideas for creative solutions to combat COVID-19 in Malawi.

"When we started the Innovation Scholars Program at MUST, we focused on building the skills of faculty to use their research skills to produce innovations that could drive local development and to create a culture of innovation at MUST, said Kurt Richter, MUST ISP Team Leader. "When COVID-19 hit, MUST tapped into these newly developed skills and improved culture to quickly produce research-based innovations to fight the pandemic."

The response to the call was positive, and the MUST team chose the most promising candidates to receive training and coaching on human-centered design. Two ideas were quickly implemented and have already caught the attention of the Government of Malawi and the United Nations Development Program.

Solar-powered Sanitation

Understanding that frequent handwashing is one of the best ways to fight the coronavirus, Charles Makamo submitted his idea for the development of a solar-powered mobile handwashing station. Makamo received an expedited training course in human-centered design from the leader of the Innovation Garage, Robert Mkwandire. With the support of GCFSI, Makamo developed a research instrument at the Innovation Garage for the purpose of ideating, prototyping, testing and adapting his innovation according to end-user preferences. Equipped with the research instrument and training, he gathered insights from patrons at urban and rural institutions, including the Thyoro District Hospital, the Msonkho House, Standard Bank of Malawi and Chichiri Shopping Centre.

Initial findings and observations led Makamo and his design team to adapt the innovation to different settings. For example, to accommodate a higher volume of patrons, the team discussed plans with hospital staff to use their hand-washing formula so that more faucets could be used simultaneously without the need of a soap dispenser. In urban settings, the design team determined the number of users the innovation served before needing to be refilled so as to outline a time schedule and financial plan for banks. Empathizing with end-users is embedded in human-centered design, and as evidenced by Makamo's experience, yielded better-adapted solutions to local problems that would more likely be utilized.

"End-user feedback should be the foundation of many tech-development processes. Without it, innovations falter in responding to the needs of their intended users," said Makamo. "I believe my innovation, the automatic water and soap dispenser, will be successful because of the human-centered design approach I took with my team to develop it."

Makamo is currently synthesizing the data he gathered from his field activities, reflecting on findings with his design team members and discussing steps forward with his coaches. These activities have caught the attention of the United Nations Development Program (UNDP) in Malawi. Pending the development of two models based on the report from his field activities, UNDP has agreed to purchase 40 units and distribute them across the country once a memorandum of understanding is created. UNDP believes the innovation will reduce transmission of the virus at hospitals, financial institutions and maintain operations of essential businesses.

Field testing has not only sparked the interest of international organizations, but local businesses as well, such as Msonkho House where the innovation was tested. "This is what a university ought to be doing," said Tom Malata, commissioner general for Malawi's Revenue Authority, which owns Msonkho House. "I have a passion for innovation that impacts society and here at the Msonkho House, we want to embrace a culture of hand sanitization now and in the future," he continued.

A Technological Approach

Another proposal submitted to the Innovation Garage uses technology to address a number of gaps in Malawi's fight against the pandemic. The idea, submitted by a group of MUST students under the advisement of a current ISP scholar, aims to develop and test an integrated platform to prevent, minimize and contain the spread of COVID-19 in Malawi. The technology incorporates advanced features that allow health officials to track disease hotspots, trace cases, and generate data that can be used for decision-making by different partners.

"Several interventions had been disseminated by the Malawian Government to combat COVID-19, but decision-makers did not know exactly where the outbreaks were occurring," said student team member Emmanual Chinkaka. "We felt it was necessary to develop an integrated platform to trace cases and locate hotspots so decisions makers knew where best to focus their efforts."

The technology platform addresses and links several issues for a holistic approach to fighting the pandemic. A mobile app will provide a central repository for users to access reliable information on COVID-19 from organizations such as the World Health Organization and Malawi Ministry of Health. The app would also allow for self-reporting on symptoms or diagnosis by Malawian citizens, providing a convenient way to conduct diagnosis in remote locations and quickly link patients to health workers. Data generated by the app gives the Ministry of Health a mechanism to trace cases and identify emerging hotspots.

David Mkwambisi, director of the MUST Innovation Garage and leader of the ISP, worked with the students to weave the human-centered design process into their app development plan. As a result, the student group quickly built a prototype to test with MUST staff. The students presented a revised version of the app to the Malawi Ministry of Health, which has since requested MUST to license the app for their use as a COVID-19 response, with the potential for future epidemic and disease tracking across Malawi.

Next Steps

As both of these innovations developed by the Innovation Garage have gained interest, the groups are working on plans to scale up the projects for implementation across Malawi and beyond. GCFSI reached out to MSU's Innovation Center to access their expertise in research licensing and commercialization. These units are working together to coach MUST through the licensing intellectual property rights processes to allow MUST to make their innovations broadly available to fight the COVID-19 response.

"As a progressive public university, the Malawi University of Science and Technology realizes that for it to be of relevance to the nation, it has to be in the forefront of contributing towards solution finding for national challenges," said Address Malata, vice chancellor at MUST. "Through research, innovation and technology, we want to contribute towards national socioeconomic conversation and policy development. The ISP is the first project that taught us how to be innovative and gave MUST the confidence to rapidly produce COVID-19 innovations."