Luciano Torriani: Academy student creates inexpensive electricity supply and water purification system

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In the coastal province of Kwale County, Kenya numerous residents in rural areas lack access to basic utilities, creating difficult living conditions, especially for families with young children. As a resident of Kwale County who grew up seeing this, 15-year-old Luciano Torriani, a Year 10 student at the Aga Khan Academy (AKA) Mombasa, knew he could make a change to help those in need around him. With this determination and passion, Luciano invented an inexpensive electricity supply and water purification system aimed to enhance the quality of life for his community.

Luciano's invention, entitled Rural Electrical and Purification Systems (REPS), was created for his personal project as part of the Academy's International Baccalaureate (IB) Middle Years Programme curriculum. Through this affordable innovation, Luciano knew it would provide a long-term solution for the communities near his home.

"The constant scarcity of electricity and clean water incentivised me to undertake this project," Luciano said. "It's unfortunate to see my community struggling for basic needs and I felt inspired to make a change."

An inquisitive student, Luciano combined his knowledge of Electrical Engineering, Physics and Chemistry gained at the Academy to create REPS, while also collaborating with electricians and community members throughout the project. In practice, REPS has two components: an electrical system and a water filter. For the electrical system, power is harnessed from a bleach and water mixture through a copper cathode and aluminium foil anode, which can generate power in a lightbulb without a battery or any other energy source. The water filter component involves a layering of materials including rocks, grass, charcoal and sand, which removes impurities from the water and prepares it for further decontamination through boiling. As a whole, the innovation can be constructed with about 40 Kenyan shillings, which is less than US$ 0.50.

"I would say that my main inspiration came from my childhood exposure to electrical systems and love for Physics and Chemistry," Luciano said. "As a child, I watched my dad manually fixing car batteries for his business. Similarly, mixing chemicals and performing abstract experiments at the Academy contributed to my excitement towards this project."

Luciano's project supervisor at AKA Mombasa, Physics teacher Phelester Obdeno, said she has always admired Luciano's commitment to his project, along with his creative and inquisitive thinking skills.

"Luciano has taken his time in designing and redesigning REPS each time we meet in order to ensure he is utilising local materials at a small-scale level."

Through his hard work and dedication, Luciano has been able to share his project with various communities in Kwale County, reaching over 100 people. To emphasise the project's simplicity and cost-effectiveness, Luciano also constructed his electrical system in front of some residents of a community in a few minutes.

"In the beginning, they were very sceptical, they just thought I was making it up because many people online promise free electricity," Luciano said. "However, when it worked, they were very shocked and very happy. Many people actually contacted me right after to ask me for the blueprints."

Luciano credits his success with REPS to the unique IB curriculum at the Academy, which pushed him to think outside the box and more like an ethical leader in his community.

"My learning as an IB student has definitely contributed to my open-mindedness, thinking and inquiring attitudes, which I practised throughout my project. I feel incredibly appreciative for the education and opportunities at the Academy, and it is one of the many reasons I am who I am today."

Luciano is just one of the many students the Aga Khan Academies is looking forward to seeing what their future entails. For Luciano's future, he is hoping REPS will continue to spread across communities and help enhance the quality of life of many people. He is also

hoping to combine his passion for serving and working with his community with his upcoming goals for when he goes to university.

"My future aspirations for REPS are primarily to spread the word about it. I want communities to be able to create the systems in my absence with ease. Although I have not yet decided what I see myself studying in university, economics and engineering look like viable areas to dive into as I would like to become self-employed and continue supporting and collaborating with the people in my community."

Watch this video to see Luciano demonstrating his innovation.