BOTSWANA INTERNATIONAL UNIVERSITY OF SCIENCE & TECHNOLOGY

NEWSLETTER

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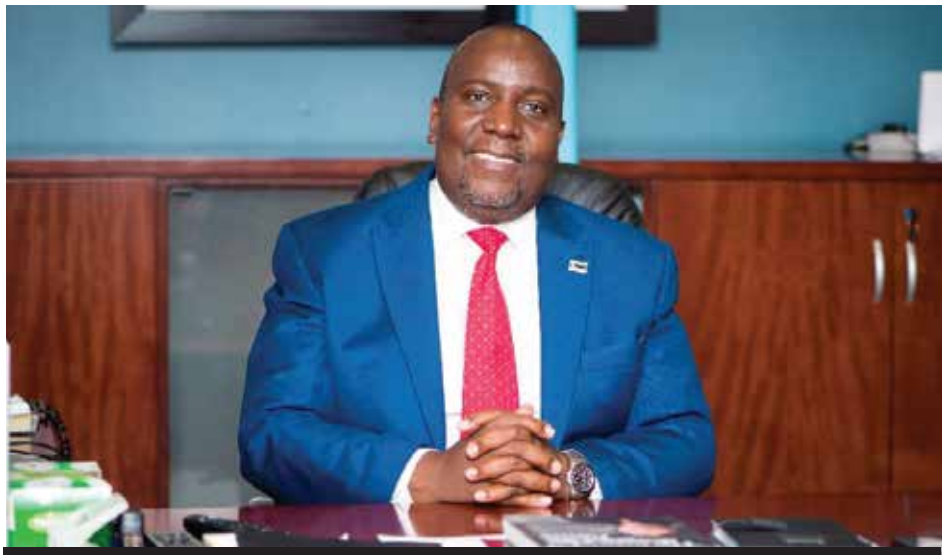
STEM education, Innovation key to Botswana's economy transformation



The Minister of Tertiary Education, Research, Science and Technology (MOTE) Hon. Dr Douglas Letsholathebe

Science, Technology, Engineering and Mathematics (STEM) education and innovation are key ingredients of the Government of Botswana's commitment to transforming her economy from heavy reliance on minerals to a knowledge-based and innovation-led economy.

The Minister of Tertiary Education, Research, Science and Technology (MOTE) Honourable Dr Douglas Letsholathebe said when officially opening the 2021 National Science Week and STEM Festival.

The collaborated events were commemorated recently on a virtual platform under the theme "Fuelling Socio-Economic Transformation through STEM Awareness and Innovation." The Minister noted that the theme resonated well with the Government of Botswana's aspirations as espoused in Vision 2036 titled, "Prosperity for All."

He said the RESET Agenda emphasised the need to embrace science and digital technologies to transform the economy of Botswana. He found it encouraging that one of the sub-themes of the event was STEM Awareness and Digitalisation. Digitalisation is one of the priorities of the President of Botswana's RESET Agenda.

"A dialogue on the subject will therefore provide the necessary impetus in the country's digitalisation process as encapsulated in the SMARTS BOTS Initiative," he said before he revealed that his Ministry was working on a private sector engagement framework to guide private sector participation in the development of the economy.

The framework intends to consider incentives that will motivate private sector investment in research, science and technology. The purpose of driving STEM and Innovation awareness, he said, was to principally provide the necessary fuel needed to power a science, technology and innovation-led economy.

"As new digital technologies emerge, so too do new industries and new sources of wealth for the economy. With this comes the need for new skills. Our nation's economy can no longer rely on the strength of the mining sector if we are to prosper," he reckoned.

He noted that understanding science, technology and innovation must be in sync with current economic dynamics. Therefore, we had to attach scientific explanations to natural phenomena in Botswana to add value. The dimension that adds scientific explanations such as the formation of unique geographical physical features could modernise our tourism industry and cater for a broader audience and therefore ease the nation's heavy reliance on minerals.

He added that developed nations have over the years, prioritised STEM education to build new jobs, create growth and drive innovation and that STEM and innovation-led economies were nested on a skilled, flexible and adaptable human resource built on resilient physical infrastructure and interactive national system of innovation.

"To realise the much-needed socio-economic transformation and continued growth, it was imperative to focus on STEM and innovation awareness. Without investment in STEM and innovation, our country could drop much more into technologically-lagging nations," the minister said.

Dr Letsholathebe further indicated that raising awareness on STEM and innovation could empower and capacitate Batswana to participate meaningfully in transforming their lives.

With the rising reliance on the use of technologies at the workplace and in daily lives that has developed exponentially particularly during the pandemic, it was vital that the natives were not left behind.

The Minister challenged STEM educators and researchers, to continue to mentor, guide, and teach the native communities and prepare them for the technology-driven economy of the future.

He, however, acknowledged the Ministry could not engage and execute planned activities for Science and STEM week effectively due to a series of disruptions by the pandemic which led to virtual commemorations.

But, MOTE was aware of the challenges that virtual platforms create for the wider viewership and was working round the clock to ease access and use of ICT for the wider population.

The Ministry has concluded processes necessary for Botswana Education Research Network (BotsRen) which will improve accessibility, connectivity and affordability in schools.

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EDITOR'S NOTE

Mrs. Rebecca Richard

Welcome to our September edition. September in Botswana is deemed a national science month, an initiative derived from the Southern African Development Community (SADC). Ministry of Tertiary Education Research Science and Technology MoTE) recently launched a Science Technology and Innovation (STI) week which aims at building awareness and nurturing interest in science, technology and innovation as well as encouraging investment in research and development. BIUST as a science specialized university hosted a 2021 National Science Week & STEM Festival in collaboration with the Ministry of Tertiary Education, Research Science and Technology and other industry partners. This edition brings you the captured narratives of the 5 days event.

Alongside with these celebrations we present to you a new doctor in the block, Dr Makhaola who successfully defended her thesis and our senior lecturer Dr Gaobotse who recently won the Fulbright scholarship and is currently based at the Ivy League Cornell University in Ithaca, New York, where he will continue his research in Stem Cell Biology.

If you wish to contribute any material for publication, kindly send it to ***barutir@biust.ac.bw*** or ***gachalaw@biust.ac.bw***

Lastly the newsletter team urges you to continue adhering to COVID-19 health protocols and taking vaccination jabs.

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FESTIVAL RECORDS EXPONENTIAL GROWTH

Vice-Chancellor, Professor Otlogetswe Totolo expressed delight at the growth and the wide participation of the festival.

The evolving Science, Technology, Engineering and Mathematics (STEM) Festival that was initiated locally by the Botswana International University of Science and Technology (BIUST) a few years ago continues to propel the nation's aspiration of a knowledge economy.

The 2021 STEM Festival was held virtually alongside the National Science Week recently. The event was held under the theme, 'Fuelling Socio-Economic Transformation through STEM and Innovation'. This event aims to celebrate STEM success stories across all fields in the country, foster interest in the subjects and pronounce the relevance of STEM in our everyday lives. The celebration seeks to stimulate on-going public dialogue and activities on STEM education, acknowledge challenges while also soliciting suggestions from the STEM ecosystem on potential solutions. It is a platform to inspire the next generation of STEM innovators and position Botswana where she can be a participant and not a spectator in the STEM race.

The National Science Week commemoration is informed by the United Nations (UN) Agenda 2030 and the African Union (AU) Agenda 2063. The initiative precipitates from the Southern African Development Community (SADC) initiative wherein the SADC Science and Technology Ministers (2008) resolved to commemorate the week once per annum.

In 2016, BIUST organised the commemoration of the National Science Week on behalf of the Ministry of Tertiary Education, Science and Technology in Palapye which it blended with its annual STEM Festival given the affinity of the programmes and commonality of purpose.

BIUST has since then, in collaboration with the Department of Research, Science and Technology in the Ministry, organised this event in Goodhope in 2019, and another in 2020 through virtual mode given the COVID-19 pandemic restrictions on movement and its other protocols.

By it being held virtually, this year's STEM Festival and National Science Week was a huge success in both international and national participation and reach. Vice-Chancellor, Professor Otlogetswe Totolo expressed delight at the growth, the wide participation and the rewards of the festival.

"I am proud to note the broad participation of our national STEM-oriented institutions, agencies, ministries and departments that have collectively created a STEM Movement to further the national aspiration of a knowledge economy in ushering this event," Prof Totolo said in his welcome remarks during the official opening of the event.

The Vice-Chancellor noted that it was undeniable that the world today views STEM education as a key driver to the socio-economic success and sustainability of the future. He said countries with thriving economies today focus strongly on STEM and innovation. He made mention of the lifesaving innovations his institutions undertook recently because of STEM.

Earlier in the year, BIUST along with the Ministry of Health and Wellness, the United Nations Population Fund and AVY of the Netherlands, launched the Drones for Health pilot project whose aim is to improve the turnaround time that medical supplies reach health facilities across the country.

"As a country, we are generally concerned with the length of time it takes medical supplies to reach our health facilities from where they are stored. This has resulted in the deterioration of health conditions that could have been attended to earlier. The drones technology, for most of my age, was unthinkable as we were growing up. It is a whole new world, one far removed from one that we grew up in. This is all a result of STEM and Innovation. As a country, we need to be in it, if we intend to be meaningful players in the global economy," he said.

In closing the Vice-Chancellor said the main goal of the National Science Week and STEM Festival 2021 was to celebrate STEM success stories across all fields in the country, to foster interest in the subjects and pronounce the relevance of STEM in everyday life. The event, he said, seeks to stimulate ongoing public dialogue and activities on STEM education, acknowledge challenges while also soliciting suggestions from the STEM ecosystem on potential solutions.

"The main aim is to inspire the next generation of STEM innovators and position Botswana where she can be a participant and not a spectator in the STEM race."

The objectives of the National Science Week and STEM Festival include, inter alia, provision of a platform to celebrate, share the excitement and showcase STEM innovations from the ecosystem (learners, communities, industry, government and universities); raising awareness, appreciation and understanding of the significance of STEM to Botswana's national economic transformation and sustainable development and promotion of Indigenous Knowledge in highlighting opportunities for its potential enhancement through STEM, Professor Totolo concluded.

CEDA CEO CALLS FOR REFLECTION ON STEM ECO-SYSTEM

Citizen Entrepreneurship Development Agency (CEDA) Chief Executive Officer Thabo Thamane has called the private entities and the government to prepare a conducive environment where the Science, Technology, Engineering and Mathematics (STEM) disciplines would thrive and unlock opportunities for the country and its populace.

He was speaking recently during the National Science Week and STEM festival. Mr Thamane was amongst members of a panel that deliberated a topic on; 'Building Botswana STEM talent through digitalization for economic transformation.'

The panel was inclusive of the University of Botswana's Vice-Chancellor, Professor David Norris, Major General MC Mophuthing, the Deputy Commander at Botswana Defence Force, Mr Thamane, the CEO of Citizen Entrepreneurship Development Agency, the head of risk management at Debswana Mr Tefo Setlhare, and Dr Kekgonne Baipoledi, the deputy permanent secretary in the Ministry of MOTE.

Mr Thamane said his organization had over the years provided opportunities or facilitated STEM opportunities. He said in its existence in the last 20 years CEDA has spent around P467 million in the STEM space and funded about 565 opportunities from micro to large.

He revealed that in the manufacturing sector, they supported opportunities ranging from Air and Space Crafts, automated parts, chemical products, computer products, mineral products, paper products, pharmaceuticals, plants and machinery.

From the service sector, he said CEDA funded civil engineering, computer repairs, dental services, electronics, information technology and medical among others.

Despite funding STEM to multimillions of Pulas, Mr Thamane reckoned that a fitting eco-system needed to be created for STEM space to meet desired development. "The million-dollar question that we need to answer is this one, 'Is the entire eco-system within the economy conducive for the successful STEM opportunities? As leaders given the responsibilities to make decisions where we are, are we creating opportunities for these young people to succeed?" he quipped rhetorically.

CEDA Chief Executive Officer, Thabo Thamane has called private entities and the government to prepare a conducive environment where STEM disciplines would thrive and unlock opportunities for the country and its populace

He appreciated STEM as a high-risk investment because some of its projects are untested in the market despite their seemingly high returns. In their efforts to mitigating the risk, he said his agency reviewed its guidelines so that they can be able to incorporate STEM opportunities.

"In our guidelines, we identified technology and innovation as priority sectors, and we say we can take your IP as collateral if you don't have normal immovable or movable assets. We have collaborated with CIPA, so we take your IP and register that, we can register the brand and we can have an interest in your brand so that whatever happens we can remain with that IP," he said.

One of the other issues to improve STEM, he said was that we needed to trust local products from these STEM products. "It is through supporting, using and relying on our products that we can create an ecosystem that would be conducive for STEM opportunities to succeed."

"We need to usher talent beyond university. There is a need for universities to partner with financiers and other organisations to ensure that talent from universities is nurtured beyond the university days. We need to inculcate entrepreneurship as an alternative to formal employment as early as primary school."

Debswana's head of risk management Mr Tefo Setlhare shared similar sentiments as Mr Thamane. He reckoned as a country we have done things the same way for the longest part and the fundamentals needed to change, and for them to change they need a sound eco-system. He said it is through profoundly empowering STEM graduates that the country would achieve the economic transformation to the desired knowledge-based economy.

"We already have people who think like entrepreneurs. We already have people who are identifying problems and are creating value-creating solutions. These are our STEM graduates, and all we must do now is introduce the entrepreneurship aspect. We need to teach them to start their businesses. We need to teach them to start creating employment. We need to teach them to commercialize their ideas, and then we would be able to grow the eco-system."

We would be able to change the fundamentals and make sure that we start to diversify our economy and create this knowledge economy that we are passionate about, he said during the discussion.

Debswana aims to unlock 20 000 job opportunities by 2024

The Head of Risk Management at Debswana Mining Company, Mr Tefo Sethare

The Head of Risk Management at Debswana Mining Company, Mr Tefo Sethare has revealed that his organisation has undertaken two colossal projects for transformation aided by its partnership with Botswana International University of Science and Technology (BIUST) that aims at creating opportunities for the citizens.

Mr Setlhare was speaking recently during the panel discussion of the National Science Week and STEM Festival that was held virtually. Debswana has for several years signed a Memorandum of Understanding (MoU) with BIUST. It is through the MoU that the mining company would unlock multi-billion opportunities for the natives through the two projects. The first major project is to transform Debswana Mining Company with its personnel, and the second is around citizen economic empowerment.

"The essence of this (transformation project) is we have realised that as an organization to survive and thrive in the future with the changing context we now need to transform the organization with the people, and we are going on this journey with BIUST," Mr Sethare said.

The premise of the citizen economic empowerment project is that Debswana would increase its citizen spend of procurement to 20 billion by the year 2024 and create citizen entrepreneurs that can create meaningful jobs to meet the target of 20 000 by 2024.

As part of these two projects, Debswana has developed a project called the entrepreneurship and enterprise development program. The program speaks to partnering with institutions to create a challenge where Debswana outsources its RND.

"Debswana is a mining company and its problems are STEM-oriented therefore needs STEM solutions and BIUST is better placed to provide solutions so we shall commercialise our RND, we would outsource it, we would run a competition and we look at the winners and within these, we would fund the proof of concept, we would fund prototyping and ultimately commercialize that invention, that idea. In this instance, venture capital would play a big role."

Professor David Norris who also made part of the panel said close networking, collaborations, a partnership between industries, government and the universities were critical to economic diversification and growth. He noted that economies in developed countries were powered by such clusters.

"This is industries coming together with research institutions and the government. The government provides a conducive environment for business to thrive. That partnership that close networking can allow us to move towards that transformation," Professor Norris, said while discussing a topic on 'Building Botswana STEM talent through digitalization for economic transformation.'

In his closing remarks BIUST Deputy Vice Chancellor, Research, Development and Innovation, Professor Abram Atta Agwu said that "Werecognize and thank BIUST, the Collaborators: MoBE, BDF, UB, BITRI, BUAN, BIH, BVI and NARDI, for conceptualizing an event of this magnitude. We thank our parent Ministry MoTE profusely for sponsoring this gallant event". He concluded by thanking all the stakeholders who played a role in making this event a success.

MAKHAOLA BAGS HER DOCTOR OF PHILOSOPHY

Ms. Kgomotso Makhaola successfully defended her PhD thesis titled "MOLECULAR CHARACTERIZATION OF NOROVIRUSES AND SAPOVIRUSES IN BOTSWANA".

Indeed, patience is a virtue. In 2015, she started her part-time PhD in Biological Sciences in BIUST, where she worked on Noroviruses and Sapoviruses. Noroviruses and sapoviruses are the leading cause of acute viral gastroenteritis (vomiting and diarrhea) that affects people of all ages, but are more pronounced and often have severe outcomes in children, the elderly and the immunocompromised.

The overall goal of her study was to "understand the genetic diversity and distribution of human norovirus and sapovirus strains circulating in Botswana among children 5 years and under with gastroenteritis". Results from this study showed that :
1) Noroviruses and sapoviruses contribute to the incidence of morbidity related to gastroenteritis among children 5 years and under in Botswana, with a prevalence of 9.3% and 5.0% respectively;
2) Noroviruses and sapoviruses circulating in Botswana are genetically diverse, with Norovirus GII.4 Sydney 2012 variant dominating infections;
3) Norovirus GII.4 strains identified in Botswana are undergoing evolution through the mechanisms of antigenic drift and recombination within the ORF1/ORF2 junction and ORF1.This was the first study globally to describe norovirus GII.4 Sydney [P13] recombinant and the first report of near full genome sequences for norovirus GII.4 strains in Botswana. Additionally this was the first report of Sapovirus infections in Botswana.

This work is a major contribution in public health response as understanding of pathogen genomics inform prevention measure including the development and or selection of candidate vaccines. Dr Makhaola graduated from the University of Central Arkansas, Conway USA, in June 2000 with a BSc in Medical Technology after which she joined the Gaborone Institute of Health Sciences as an Assistant Lecturer in Clinical Chemistry.

In 2003 she joined the Bamalete Lutheran Hospital as a Medical Laboratory Manager and later served as the Technical Supervisor at Botswana Harvard HIV Reference Laboratory from 2007 to 2014. In 2009 she won the prestigious Fulbright Foreign Scholar award, to pursue a Master of Science in Virology and Molecular Biology at the University of Nebraska in Lincoln, USA, which she completed in 2011. At the end of 2014 she joined the Center for Disease Control and Prevention- Botswana, where she is currently working as the Laboratory Technical Advisor. Throughout her career she has contributed immensely to the Botswana HIV response program. Her research work includes TB/HIV and HPV. From her work she published 3 manuscripts in peer reviewed journals, 1 pending publication and the work managed to attract an invitation to contribute to a book Chapter. Lastly, some of this work was presented at the 6th International Calicivirus Conference, Savannah Georgia, USA in 2016. She is very passionate about learning and additionally, she holds a master's degree in Project Management from the University of Botswana.

Ms. Kgomotso Makhaola who just bagged her PhD in Biological Sciences.

AN ADEPT STEM CELL BIOLOGIST DR. GOABAONE GAOBOTSE SCOOPS THE FULBRIGHT VISITING RESEARCH SCHOLARSHIP GRANT

By: Tshegofatso Teseletso

Dr. Goabaone Gaobotse a Stem Cell Biologist, who holds a PhD (Stem Cell Research)

Botswana International University of Science and Technology scholar, Dr Goabaone Gabotse has become amongst a growing number of the institution's academics to scoop a research scholarship grant. He was recently awarded the 2021/2022 Fulbright Visiting Research Scholarship Grant, a Certificate qualification in Stem Cell Culture by the Keck School of Medicine, University of Southern California, USA.

The scholarship bequeaths him admission into the Young African Leaders Initiative (YALI) training program which recognises and develops the skills of young African leaders to bring change in their communities. The current one being residency at the Ivy League Cornell University in Ithaca, New York, USA. Dr. Gaobotse is a Senior Lecturer, Researcher and Research Supervisor in BIUST.

Dr. Goabaone Gaobotse, is a fervent and industrious Stem Cell Biologist, who holds a PhD (Stem Cell Research) received at the age of 29 from The University of Manchester, England and an MBSc (Molecular Biotechnology) from Curtin University, Australia.

A fascinating and inspirational expert who is the first and only Stem Cell Biologist in Botswana. In a bid to impart knowledge, in 2016 he developed two Stem Cell Biology modules at both undergraduate and post-graduate level in the Department of Biological Sciences and Biotechnology, BIUST.

The zealous Stem Cell Biologist has served the BIUST community as a lecturer since September 2015. His adeptness has landed him a promotion as a senior lecturer. Dr. Gaobotse explains that his roles include teaching, doing research and supervising research students.

Over the years Dr. Gaobotse has enhanced and shared his skills through mentorship and supervision. He is currently supervising and/or co-supervising five (5) MSc students and has previously supervised six (6) under-graduate students. "I am involved in a lot of community education engagements," said the ebullient Dr. He doesn't stop there, he is also engaged in collaborative social engagement among them rewarding best standard seven (7) students who attained grade A in their final examination with P500.00. Dr Gaobotse also gives motivational talks across Palapye primary schools.

"I also do guest lectures and seminars around Botswana to sensitize communities about Stem Cell Biology, Research and Therapy," he said.

Dr. Gaobotse elucidated that his primary career goal is to see the conceptualisation of requisite law that regulates research on human Embryonic Stem Cells (hESCs). He further highlights that Stem cells are special cells in that they can form any of the over 200 different cell types in the adult body. In that way they hold a very special place in medicine. He further stated that his secondary career goal is to develop a BSc Honours degree programme in Stem Cell Biology here at BIUST. "Our children should not be left behind in this evolving space in medicine," said Dr. Gaobotse.

Furthermore the passionate Dr. delineated that there is need for more Batswana to be educated in this area because many breakthroughs have been made through Stem Cell Therapy such as the remission of HIV in a patient after hematopoietic stem cell transplant. "We, as Batswana, need to be a part of this global medical phenomenon and we should not wait for the west to make such breakthroughs and then join in later," emphasised Dr. Gaobotse.

On a light note the good Dr. painted his day away from office in this order; spending time with family, watching football matches precisely his favourite team (Manchester City), listening to or watching poetry (among them Akala his favouriye poet) and reminiscing on his old time favourite movie Dead Poets Society.

Dr. Gaobotse explained that Stem Cell Biology, Research and Therapy is a very promising field of medicine. "It remains our only hope to solving some of the most debilitating diseases of our times. I appeal to BIUST and the government to invest in this area," he said.

Lastly the passionate Dr. delineated that there is a need for more Batswana to be educated and specialising in this area because many breakthroughs have been made through Stem Cell Therapy such as the remission of HIV in a patient after hematopoietic stem cell transplant.

"We, as Batswana, need to be a part of this global medical phenomenon and we should not wait for the west to make such break throughs and then join in later," Dr Gaobotse emphasised.

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In conclusion, he expressed commitment to providing a conducive legislative policy environment to promote STEM and innovation awareness. The Ministry has partnered with the UN Commission on Science and Technology for Development (UNCTAD) to review the Research Science Technology and Innovation (RSTI) Policy of 2011

The Ministry has set aside funds to support research projects in the key research institutions. As testimony, four research projects that benefited the support were launched during the inauguration of the month of science.

"Let me assure you of my Ministry's unwavering support towards your efforts to raise awareness, educate society and develop relevant policies, strategies and policy instruments on STEM and innovation," Dr Letsholathebe concluded.

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