ADDRESS BY THE MINISTER OF HIGHER EDUCATION, SCIENCE AND INNOVATION,

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higher education & training
Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

ON THE OCCASION OF THE 4IR VIRTUAL CONFERENCE ORGANISED BY FUZE BUSINESS INITIATIVE
25 June 2020

Programme Director, Mr. Themba Ndhlovu;

Ms. Aruna Singh: Acting DDG: TVET Colleges;
Mr. Sanele Mlotshwa: President: South African College Principals Organisation;
Dr. Zuma: CGC TVET;
Prof Chris Adendorff (PhD, DBA, PhD): Senior Futurist;
Prof. Sipho Seepe: DVC: Institutional Support, UniZulu;
Dr. Sibongiseni Thotsejane: NSFAS;
Mrs Maphefo Anno-Frempong: CEO: TETA;
Mr. Khaya Sithole: Academic Consultant & Accountant;
Mrs. Joy Mabuza Director: TAG-IT;
Mr. Hertzy Abeya: Managing Director: Student Hub;

Ladies and gentlemen

Greetings to you all

It is a special occasion to address you today making use of (what I believe) 4IR technologies are. Maybe not the high end of artificial intelligence or augmented reality, but I believe this is the start of great new things.

We all know that COVID-19 has forced us to think and do things differently and for the first time we are forced to look at the 4IR in the context of the 'new normal' that we are living at the moment, and we all know, that this is going to continue for months to come. This is for me indeed a celebration of the future - of doing things differently and more effectively – like conferencing more people, more interactively through making use of technologies.

I am always filled with hope for the future and for our country when witnessing the creativity, adaptability and devotion of people that is evident here today. I hope that we will continue even after the state of disaster, not to travel the world for conferences, but to increase access and participation of more people making use of innovative and interactive technologies.

More important, we have to think differently, apply different methodologies and technologies to be more effective and in our country's current economic state, definitely more cost-effective in the ways we are doing things.

I want to congratulate the organisers for taking up this challenge and organising this virtual conference. I hope this is the first of many to come.

The Imperative for Change

We now witness that we are living in an ever-changing world and the only thing constant in life is change. This is even truer now than ever. As a nation, we find ourselves faced with the advent of the 4th industrial revolution. We are left with no choice but to learn, adapt and of

course … change. But this is not enough, we must not just adjust, we must also be innovators, creators of new technologies.

The 4IR is not a social phenomenon with a predetermined trajectory. While many commentators seek to highlight the negative social consequences of the 4IR (particularly in terms of job losses), we believe that the social effects of the 4IR will depend predominantly on how we, as South Africans and in specific the PSET system and our National System of Innovation, choose to harness it.

If the values and principles on which this vision is based underpin the 4IR, its technologies and tools can be harnessed in a myriad of ways to create a better, more inclusive, wealthier South Africa that benefits all its citizens.

We all know that new and better technologies are fast becoming a major player in our work, our education and our lives as whole. Of course with that comes new challenges and great opportunities too. We as a country need great minds, more voices, we need young people to help us navigate these new phenomena hence I am looking forwarding to hearing more voices through the use of technologies and the advancement of 4IR.

Presidential 4IR Commission and MTT on 4IR

Our President has on many occasions spoken about the various initiatives we are taking as a country to equip ourselves for this phenomenon, like the Presidential Commission on the 4IR. The commission has made eight recommendations that will put South Africa's fortunes on the upward trajectory of the 4IR.

For us, it is significant in Education and Training that the first recommendation is to build human capacity in the area of the 4IR.

As a country, we have to contribute to the 4IR, to research and development. I therefore welcomed other recommendations of the Commission that focus on the establishment of the National Artificial Intelligence (AI) Institute; the creation of the Advanced Manufacturing Institute (AMI) and the establishment of a National Data Centre.

For this all to happen, we must purposefully promote the adoption of 4IR technologies in our classrooms and the emergence of future industries and platforms, by also reviewing, amending and creating policy and legislation and an enabling environment for our country to advance in the 4IR.

Another recommendation is to build 4IR infrastructure, which integrates with existing economic and social infrastructure. Without infrastructure, the 4IR will only remain a dream of this country.

The recommendations of the 4IR Commission have stressed how important it is that we position ourselves in such a way that we are not playing catch-up but rather that we are in the forefront of the revolution.

It is given that for economies to tap into the economic potential of the 4IR, there needs to be strengthened collaboration between governments, businesses, academia and civil society.

Ministerial Task Team on 4IR

I am delighted to report that I have received the first draft report of our own Ministerial Task Team on 4IR that recommends that in order for the PSET, Science and Innovation system to embrace and take advantage of the 4IR, it has to:

• support research and innovation (contribute to the 4IR),
• equip lecturers and students to prepare for a world of work that is fundamentally different to today's (building capacity for functioning in the 4IR), and
• embrace the 4IR in the PSET system, how it is managed, administered, equipped, teaching and learning taking place and how assessment is being done (impact of the 4IR on PSET).
Aligned with the President's Commission, the MTT made several recommendations that I will carefully consider in the next few weeks and I can assure you, that both Departments, Higher Education and Training and Science and Innovation, will engage these in a progressive way.

At the centre of the report is a PSET system that provides:

• A strong core of education and training programmes, with up-to-date curricula that align with the changing needs of both South African society and the world of work in the context of the 4IR;
• Access to high quality educational opportunities that meet a burgeoning and immediate demand for 'digital skills' in the labour market created by the 4IR and a parallel need for a new wave of South African innovators and entrepreneurs who will help to drive and shape the 4IR to the social and economic benefit of all of its citizens;
• Massive increases in short, skilling opportunities for unemployed and underemployed South Africans in parallel with wider government and private sector efforts to rapidly grow new employment opportunities for all; and
• Growing emphasis on integrating into PSET programmes and courses learning opportunities that prepare people to be able to cope with accelerating change, both socially and economically, and thus that emphasise key generic skills.

We are therefore looking at educational opportunities that prepare students who are capable of creative insights, collaborating in diverse social and economic sectors, and navigating through cultural differences, which will provide them an advantage in the workplace.

For this to be realised, curricula and educational programmes must be responsive to the accelerating pace of technological and societal changes and approaches in and outside the classroom must be much more flexible in terms of how and where students access learning opportunities.

Work-integrated learning (WIL) remains an integral part of most of our PSET offerings. We have to however, have a fresh new look at WIL and how to make it practically possible and less bureaucratic. The workplace is an essential site of learning and it is critical to be able to bring PSET to the workplace, and the workplace to PSET.

We also need the inversion of TVET education, a sea change to have students coming to college as apprentices in the workplace, as opposed to an academically based model. In addition I intend availing some government resources to support and harness innovation in the TVET college sector through, amongst other things, the establishment of technology stations in colleges.

We have to think of more innovative ways using the 4IR of Artificial Intelligence (AI), machine learning, augmented reality, simulations and automation.

I am looking forward to the outcome of the discussions today, to also give us some pointers and provide us with innovative and implementable solutions within our current economic context.

We cannot afford to just pour more and more money into education and training, we have to think smarter, get much more innovative ideas and get much more done with reprioritising

current budgets and most important – get young people to graduate from the PSET system that can live a life in the 4IR.

Another issue, that the MTT has also recommended is that we have a relook at accreditation and quality assurance systems. We have to allow students to accumulate 'stackable micro-credentials' throughout a lifelong learning trajectory, which they can acquire while moving in and out of the education system and the workplace and through a diverse, and growing, range of educational modalities enabled by technologies and WIL.

One thing that COVID-19 has taught us is that we have to support augmented/remote student learning through a variety of teaching and learning methodologies.

This was not possible a year ago, because we were still very much in the talk-and-chalk mode. I want to emphasise, multi-modal teaching, learning and assessment is not an option for universities and TVET colleges any more, it is a necessity. Everyone in the PSET, from universities, TVET and CET colleges to skills development programmes and WIL must embark on modes of educational delivery that embrace the principles of open learning, as outlined in current PSET policies.

Moreover, where policies and legislation are not in support of the 4IR, we must, as the President's Commission has recommended, urgently revise and adapt them to be aligned with the 4IR.

Infrastructure advancement and development are key to the 4IR. We have started with some initiatives like laptops and data to students, the development of high quality connectivity for all universities and TVET Colleges in collaboration with the DSI and South African National Research Network (SANREN) and other initiatives.

However, one thing that is very important, is that we have to develop integrated delivery models that work broader than individual institutions - at district and regional levels. PSET institutions in common localities and working in the same areas have to work with each other, with public and private enterprises, with social structures, with the communities they serve, and with local, district and provincial government to create articulated, seamless, responsive education and development opportunities.

We have to think about sharing learning and teaching materials and support the open educational resource (OER) movement, we have to share infrastructure, expertise and systems. Duplication remains a very costly and ineffective way of educating the masses.

Current Initiatives

Post School Education and Training:

What I have said so far does not mean nothing has been done already. I am positive about the changes made to education, even at the basic level. New subjects are being introduced in our schools, universities, and colleges, which aim to implant the seed for future skills knowledge from a young age.

We can expect our young learners to start learning subjects like coding and robotics already at primary school level so that they have the foundation to master the skills and capabilities that are critical to successfully functioning in the future world.

Higher education institutions are also not exempt from adapting and being innovators in this new era of advanced technologies. We see many institutions and projects excelling in research and innovation that aim to address different aspects of the 4th industrial revolution.

There are many partnerships arising within the higher education and training space as a result of the need to tackle this issue of adapting from a multi-pronged but holistic approach. It is also the role of citizens to get an education that will equip them efficiently for the 4IR, because new technologies will definitely change the nature of work.

Science and Innovation:

Following last the 2019 signing of an accord between South Africa and the World Economic Forum (WEF), we are in the process of establishing an affiliate centre of the WEF's Fourth Industrial Revolution Centre (C4IR) Network.

We are establishing the affiliate centre as a public-private partnership based at the Council for Scientific and Industrial Research (CSIR).

Affiliate centres focus on issues of local concern, but also contribute to the overall research and thought leadership processes of the C4IR Network. As a government we are developing an integrated country strategy on 4IR. The plan will include detailed interventions to be carried out in order to achieve global competitiveness through addressing national developmental imperatives in key economic sectors like agriculture, finance, mining, manufacturing and ICT.

In addition, the centre will focus on developing governance frameworks and policies for 4IR in areas such as artificial intelligence and machine learning; blockchain and distributed ledger technology; autonomous and urban mobility; the Internet of Things, robotics and smart cities; and drone technologies.

Data Science for Impact and Decision Enhancement

Through the Council for Scientific and Industrial Research (CSIR) we have developed the Data Science for Impact and Decision Enablement (DSIDE) programme.

The programme introduces young participants to basic and advanced analytic techniques through interactive workshops; then requires them to apply these skills within the context of practical projects scoped around real data challenges and datasets provided by stakeholders from various domains, such as the private sector, government departments and agencies.

Over 45 student-version prototypes (proof-of-concept demonstrators) of varying degree of maturity and features have been developed to address the challenges presented by these partners. Every year the programme concludes with an exhibition where the prototypes developed in that year get presented and exhibited to the stakeholders and the interested parties from the general public.

Most of the students participating in the DSIDE programme are the 3rd or 4th year in Computer Science, Engineering or IT related fields.

Under the broad DSIDE initiative, the DSI has finalised in partnership with DHET an initial 2-year programme to mine various higher education data sources for insight. It is therefore critical for the Post School Education Sector to reflect on the issue of data sharing and what kinds of policy questions can be better answered by exploiting available databases.

South Africa National Blockchain Alliance (SANBA)

Again, through the Office of Digital Advantage (ODA) and the Council for Scientific and Industrial Research (CSIR) we undertook an investigation, through workshops and meetings,

into possible ways to support blockchain research, development and innovation in South Africa.

The investigation had, amongst others, the objectives to undertake advocacy and education regarding the potential for blockchain as a foundational and transformational technology and to understand the need for blockchain skills and capacity-building within South Africa.

To catalyse Blockchain research, development and innovation a programme supported by DSI and implemented through the ODA and the South African National Blockchain Alliance (SANBA) was initiated in 2019/20. The SANBA, which was launched in April 2020 to connect academia, civil society, business and government into a pre-competitive collaboration space to support research, development and innovation in blockchain technology and its application in these sectors.

It also facilitates skills development, advocacy and education on “all things blockchain”. The first year of the porgramme was funded to an amount of R2 755 860. It is expected that the level of funding from 2020/21 to 2024/25 will total R16 690 511.

It is anticipated that the centre will provide a platform for the country to connect with leading technology innovators and have access to innovative campuses in jurisdictions where other 4IR centres are located.

New careers and new industries

Nevertheless, we have to work much harder, much smarter to take advantage of the 4IR and to prepare our students for this rapidly changing world. We already see the huge changes in the nature of work due to technology with the advent of things like the gig economy, automation and the rise of completely new careers and occupations.

The way people work is becoming flexible and global. There are new careers rising. Had any of you thought that there would one day be a social media manager, a drone pilot, a data scientist, a data miner, or even online marketers?

There are many other new and complex challenges that will require solutions in the future and which are going to completely change the way we work. This is where great minds will be required the most. Yes, we know, the 4IR results in new careers and the redundancy of some.

The paramount questions we will need to constantly ask ourselves is, am I still relevant in this era? How do I remain relevant? What do I need to know to remain relevant and what do I need to learn to remain relevant? Education and training will play a major role in the solutions of the future. We will need adaptable people who will be able to drive the development of innovative solutions relevant to the time we find ourselves in.

In this day and age, business and industry are already making huge changes in how products are produced, how clients receive services and how tasks are executed. We see emerging, new and innovative business models. In addition, what always amazes me; somewhere in these solutions, are young people creating the new models and embracing the change.

It gives young people the opportunity to create a new world for ourselves. We have been witnesses to the rise of global start-ups, which were extremely difficult to establish before technological advancements.

Such businesses have shown that technology coupled with intellectual capital play a major role in their establishment, functioning and longevity. Because we are changing the way we do business, it has become clear that the skills and knowledge needed to function and thrive in the various careers our students hope to pursue in the future will change too. Everyone will need to be lifelong learners because the rate of change will also increase.

According to the Future of Jobs Report of 2018, there is a major shift in future jobs. Lots of high tech jobs are on the horizon like Data Analysts and Scientists; AI and Machine Learning Specialists; Big Data Specialists; New Technology Specialists and Software and Applications Developers and Analyst.

However, is interesting, alongside Robotics Specialists and Engineers you will find jobs like People and Culture Specialists; Client Information and Customer Service Workers and Client Information and Customer Service Workers. We have to fill the whole spectrum of the job market – we are not going to replace people with machines, we are going to make people better workers using innovative technologies.

As I conclude - Education and training has been a solution to many problems throughout the history of humanity, hence we always go back to it whenever we find ourselves in a predicament. As a country, we also go back to education and training to help us solve all our problems, which is why education will play a very critical role in understanding and adapting to the 4th industrial revolution.

At the core of it all - we need education – education and training that keep pace with the 4IR. I wish you well in your deliberations today and want to encourage you to deliberate on possibilities, on realistic possibilities that are implementable and that we can take further in the PSET system.

I thank you.