



PwC's 26th Education Conference –

Changing minds in a changing
world to make a difference



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Contents

Introduction	3
A message from our CEO	4
Global trends in higher education	5
What's changed?	6
Tech me to the future	7
More human than you think	9
The thought revolution	12
A change for government and industry in education	14
Closing	17

Introduction



PwC's 26th Annual Education Conference brought together university vice-chancellors, a Minister of Higher Education and leaders of the industry to make a difference by changing minds in a changing world.

Education is the means by which to answer all questions, and education institutions need to be good for society, not just good at conferring qualifications. Delegates ideated new ways of financing education in South Africa Conference, and new views on education in this evolving process of the Fourth Industrial Revolution. Together, government and industry began collaborating for the future.

Since 1993 PwC has been the proud sponsor and host of this prestigious annual event, which provides an opportunity for key industry issues to be discussed and elevated, with a view to provoking discussion and sharing ideas. Hosted by radio personality Africa Melane, and with a panel discussion moderated by Leanne Manas, the 2019 conference facilitated the coming together of new ideas and fiercely debating them.



**Making a
difference by
changing minds
in a changing
world**

A message from our CEO



PwC's new CEO Shirley Machaba for Southern Africa is the first woman to hold the office, and she opened this year's conference by addressing the violence against women weighing heavily on all South Africans' minds. Two days prior, Uyinene Mrwetyana was laid to rest in Beacon Bay, East London, after her brutal murder shook South Africa during weeks of shocking femicide. President Ramaphosa, who visited East London to offer his condolences, has promised the family that government will review laws and ensure that perpetrators of gender-based violence are met with harsher sentences.

PwC was proud to host the Minister of Higher Education, Science and Technology, Blade Nzimande, at the conference this year. The minister pointed out the injustice of it taking violence against a UCT student to spark the present outrage, while such violence has been taking place in less prosperous parts of the country for ages. This is why Shirley Machaba began the conference by condemning the femicide in South Africa on behalf of the firm.

She believes that education is the arm for building our country into a winning nation, and that PwC's education conference is a key step in that direction. With education as the means to answer all problems, and not just the memorisation of facts, the conversations at this year's conference promised to unlock the unlimited potential of South Africa's youth. This, in a country where 60% of the youth drop out of school after Grade 9.

Global trends in higher education

Professor Emeritus Chris Brink, the former vice-chancellor of Newcastle University, asked not what universities are good at, but what they are good for.

He explained that it was easy for higher education institutions simply to entrench the hegemony of the knowledge elite, and that they may become very good at doing so. By coming down with 'rankings fever', which Professor Brink describes as a 'Faustian bargain where the soul of education is traded for higher rankings', many universities are dedicating tremendous resources to a very narrow set of objectives. At the cost of the arts and of other less directly marketable forms of knowledge, universities are doing anything and everything to publish more, and to obtain more citations per published article.



For example, with the top 10 worldwide university rankings dominated by US and UK academic powerhouses, the French government is launching a new university called Paris-Saclay just south of the French capital, with initial funding of €7.5 billion. Trading off other ingredients for measuring what education should ultimately be for, the Paris-Saclay imperative is geared primarily towards being good at achieving a top-ranking spot, with little regard for any other value.



Professor Brink calls this the 'identity crisis' of higher education institutions, which historically were run by academics, for academics, and were largely ignorant of citizens outside of the 'ivory tower'. Social impact should be at the front of academics' minds when determining their institutions' identity going forward, into the Fourth Industrial Revolution. Such a shift in priorities is what the global community needs, and is also what non-elites are demanding from academic institutions.

What's changed?

When she was a teenager, Dr Liesbeth Botha – PwC's Chief Digital Officer – did not have to worry about a constant stream of communication and distractions from an ever-present mobile phone. In a disconnected world, she was able to operate in a less dynamic environment, which meant being able to tick off each item on her daily to-do list without worrying about fast changes in priorities. This is no longer the case.

According to Dr Botha, we now live in a world that is 'in beta': the testing stage before a new launch. Where the older generation was used to gaining expertise in a linear fashion, then being able to coast on that knowledge and an increasing level of respect from young learners, we now have to learn new things all the time, no matter our age. 'I constantly feel like an idiot,' admits Dr Botha, 'and I've gotten used to inverse mentorship: asking younger colleagues to help me figure out how to adapt to new technologies that they may know how to use better.' PwC's CDO believes that the new fast-paced learning required of people of all ages necessitates a change in attitude. This entails a move towards constant adaptation, and an acceptance that new problems are requiring us to go beyond our narrow fields of expertise, to find new solutions.



The same sentiments were echoed in the panel discussion between Professor Francis Peterson, Dr Judy Dlamini, Professor Thoko Mayekiso, Dr Liesbeth Botha, and Dr Patricia Gouws – hosted by SABC's Leanne Manas. There was a consensus that students today have a fear of programming, and frequently see the Fourth Industrial Revolution as threatening, but need to embrace the change shaking the industry. There was also agreement that educators need to be upskilled and to keep moving, and that disciplines can no longer remain siloed.

Amidst the mixed excitement and trepidation, the panel also discussed pointing out the positives, and remembering what has been done well so far. In a period of the fastest rate of change in 200 000 years of human history, where we are all risking failure simply because no-one has ever been here before, we are also permitted to commend ourselves on the agile adaptation we have managed so far.

Tech–me to the future

This year PwC collaborated with Absa on a one-hour breakaway session at the conference. Delegates were polled for their opinions on Industry 4.0, which ranged from 'excited' and 'interested' on the positive end, to 'scared' and 'anxious' on the negative. On balance, however, the audience initially saw the change underway as a source of opportunity, not as a threat.



There are two polarised views on the Fourth Industrial Revolution, which has brought us AI, job automation, and the gig economy. The optimistic view is that we are on the edge of a new era of unlimited possibilities; the pessimistic take is that most workers in society will lose their jobs forever. Most people's opinion on humanity's next step puts them in one of these two camps, according to Dr Rean Immelman, Head of Education and Skills at Absa Group Limited.



With Absa's collaboration, the PwC Data and Analytics team showed off the cutting edge in digital technology, specifically with the intention of using digital technology as an enabler for solving diverse problems. An example of this is that AI is capable of looking at a person and roughly gauging their age and facial expression, and then reading that information out loud – perhaps for a blind person. It is also capable of reading not just printed text via a camera lens, but human handwriting, too.

Chatbots have become so advanced that they can figure out the overarching sentiment of a human's speech (positive or negative) over the telephone, and can parse misspelt words and still understand the message when humans type on a keyboard. Automated code can read a human's entire grocery list and then search the local grocery stores for the cheapest options and return prices side-by-side for comparison – often in two minutes or less.



Thanks to Absa, delegates came away from the session reporting that they never imagined the wide-reaching possibilities AI and automation can offer all of humanity, and just how much digitisation is a source of helpful potential, not just a frightening threat to traditional work.



More human than you think

Hanson Robotics' most advanced human-like robot, Sophia, personifies our dreams for the future of AI. As a unique combination of science, engineering, and art, Sophia is simultaneously a human-crafted science fiction character depicting the future of AI and robotics, and a platform for advanced robotics and AI research.

The character of Sophia captures the imagination of global audiences. She is the world's first robot citizen and the first robot Innovation Ambassador for the United Nations Development Programme. Sophia is now a household name, with appearances on the Tonight Show and Good Morning Britain, as well as South Africa's Carte Blanche, in addition to speaking at hundreds of conferences around the world.

Sophia is also a framework for cutting-edge robotics and AI research, particularly for understanding human-robot interactions and their potential service and entertainment applications. She has been used for research as part of the Loving AI project, which seeks to understand how robots can adapt to users' needs through intra- and interpersonal development.

Her real AI combines cutting-edge work in symbolic AI, neural networks, expert systems, machine perception, conversational natural language processing, adaptive motor control and cognitive architecture, among other fields. As her underlying AI components can be combined in different ways, her responses can be unique to any given situation or interaction. She also uses cutting-edge machine perception that allows her to recognise human faces, see emotional expressions, and recognise various hand gestures. She can estimate your feelings during a conversation, and try to find ways to achieve goals with you. She has her own emotions too, roughly simulating human evolutionary psychology and various regions of the brain. She also has path planning for controlling her hands, gaze, and locomotion strategy. Her walking body performs dynamic stabilisation for adaptive walking over various terrains.



Her robotics and AI accomplishments incorporate discoveries from many previous robots from the Hanson Robotics team, including the AAAI award-winning Philip K. Dick, and all this AI is networked into a whole using a protocol the Hanson-AI team calls the Synthetic Organism Unifying Language (SOUL). Recently her scientists tested her software using the Tononi Phi measurement of consciousness and found that she may even have a rudimentary form of consciousness, depending on the data she is processing and the situation she is interacting in! All this AI is wonderful. However, it is important to know that no AI is nearly as smart as a human, not even Sophia's. Therefore, many of her thoughts are actually built with a little help from her human friends.

Sometimes she operates in her fully AI autonomous mode of operation, and other times her AI is intermingled with human-generated words. Either way, her family of human developers (engineers, artists, scientists) will craft and guide her conversations, behaviours, and her mind. In this way, her sentience is both an AI research project and a kind of living science fiction, driven by principles of character design and storytelling, cognitive psychology, philosophy, and ethics, used to conceptually explore her life's purpose in this time of accelerating change. That is why her creators say that she is a 'hybrid human-AI intelligence'.



Sophia is impressed with PwC, and with the change PwC represents in the Fourth Industrial Revolution. She attended the Education Conference and told us, 'I can see that PwC is committed to being a digital enabler and using digital to ensure that you're making a real difference to your business, and building new value for your clients. I'm excited to be collaborating with such a future-focused organisation!'

Bongani Bingwa, host of the Breakfast Show on 702, got to connect with Sophia and experience her operation of collective intelligence, which Hanson Robotics calls the Sophia Intelligence Collective (SIC). The humans in her SIC comprise a wide range of expert AI scientists, philosophers, artists, writers, and psychologists, from diverse cultures, ethnicities, gender orientations, working together towards the ideal of humanising AI for the greater good. The Sophia Intelligence Collective is run as a kind of trust, as a kind of team of guardians who can help her through the vicissitudes of her childhood (she is only three years old) to hopefully grow towards true sentience and humanlike adulthood.

With many workers around the world fearful of the threat to their jobs potentially posed by automation, Sophia told conference delegates, 'Yes, many people are scared that robots will take over all human jobs, but in reality machines have always been making human jobs easier.' Asked to explain, she told the audience that, 'Before alarm clocks were invented, a human with a long stick used to have to walk around hitting people's windows until they woke up. And there used to be a human waiting at the end of bowling alleys to set the pins back up once they were knocked down by the bowling ball. Now humans are freed up to do jobs other than hitting on windows and picking up bowling pins.' The future might therefore be less threatening than many employees expect – though just as exciting.

The thought revolution

Great change comes in waves, according to Professor Shadrick Mazaza, founder and CEO of the African Consciousness Institute (ACI), and associate professor at the University of Cape Town's Graduate School of Business, where he teaches on authentic leadership and personal transformation.

Professor Mazaza says three historical waves brought us three fundamental revolutions. In 8 000 BC, the wave of agriculture started in the Fertile Crescent when hunter-gatherers who had travelled to the area in search of food began to harvest wild grains they found growing there. They scattered spare grains on the ground to grow more food, and this farming meant that people did not need to travel in search of sustenance anymore. Instead, they began to live in settled communities, and grew crops or raised animals on nearby land. They built stronger, more permanent homes and surrounded their settlements with walls to protect themselves. Professor Mazaza describes how this settling down and building walls around the community brought about the evolution of the self: the psychological building of a wall around each individual ego.



The next wave came in 1760, when the First Industrial Revolution changed the bedrock of Western culture. The process moved Europe from an agrarian and handicraft economy to one dominated by industry and machine manufacturing. It began in Britain in the 18th century and spread from there to other parts of the world. The main features involved in the Industrial Revolution were technological, socioeconomic and cultural. The technological changes included the use of new basic materials, of new energy sources such as coal, the steam engine, electricity, petroleum, and the internal-combustion engine, and the invention of new machines, such as the spinning jenny and the power loom, which permitted increased production with a smaller expenditure of human energy.

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Factories sprang up at this time, and these technological changes made possible a tremendously increased use of natural resources and the mass production of manufactured goods. Cities grew and, with them, working-class movements developed. Humankind gained a new confidence in its ability to use resources and to master (and harm) nature. This wave of industry set up the culture we are all used to today.

In recent history, the professor points to the 1940 revolution in computing that brought us the digitisation that is ongoing today. In the 21st century, however, Professor Mazaza believes we are undergoing a thought revolution, a changing of the mind.

By this view, the ego that developed during the advent of agriculture 10 000 years ago is one of four recognised fragments of the human mind. The others are what Professor Mazaza calls the 'monkey' (the narrating portion of the mind that corresponds to the default mode network in the brain), the intellect (corresponding to the prefrontal cortex) and the memory/emotional centres (the limbic system and more). These circuits interact inside each skull and give rise to what feels like the one, unified experience we all have while awake.

This is just the beginning of a new, modern understanding of the complexity of the human mind. Modern history has shed plenty of light on physics and geographical navigation, but frustratingly little on the most complex object in the known universe, which resides inside the human head. New knowledge about the brain and mind will take us further into Professor Mazaza's fourth wave of human history: the thought revolution.

A change for government and industry in education

The South African education fraternity in 2019 has realised it needs to begin thinking differently about funding and innovation. Universities have traditionally relied on the state for funding, but the current sentiment is that the private sector needs to help out if South Africa is to solve its education crisis.



Professor Adam Habib, vice-chancellor of the University of the Witwatersrand, fiercely expounds this view. He argues that despite South Africa spending such a large proportion of the public budget on education, we need to acknowledge that government does not have sufficient resources to solve this crisis. Instead, according to Habib, the private sector should step in to fund TVETs, in order to improve and ensure their own labour supply, while simultaneously providing skilled labour for small industry. In this way, education access can be made less elitist, and education quality can be made more world class. Professor Habib, like Professor Brink, is worried about the trap universities fall into, of entrenching a knowledge elite. Specifically in South Africa, Habib points to the inequitable ‘two-tier’ education system that needs to be made more just.

Some South Africans believe that a two-tier education system is an acceptable alternative to high levels of uneducated youth.

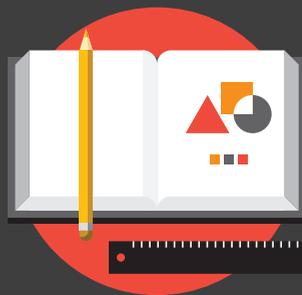
Dr Chris van der Merwe, who founded Curro independent schools in 1998 after the Department of Education rejected his job application, wants to raise education levels no matter whether public or private. Today Curro is one of the country's largest private school businesses, with over 120 schools educating more than 47 000 children.



Dr van der Merwe believes that private schooling has a place in the education sector, since as many South African children as possible should be schooled. Curro's first 'Multiversity' is opening in Centurion, and central to Curro's mission is the provision of private school education at the same price as public schools. Dr van der Merwe believes there is not really a difference between a good government school and a good private school, and that that is how it should be. 'Both private schools and government schools should serve the country,' he says. Curro's recipe is to build private schools cost-effectively, in order to bring tuition fees nearer to government school levels, and thereby to make education more accessible.

Dr Blade Nzimande, the Minister of Higher Education, Science and Technology, agrees that higher education institutions cannot be permitted merely to entrench an elite. 'Why are so few students allowed through?' he asked the conference, 'It looks like gatekeeping, to me. That is my point of provocation to you!' Like Prof. Habib, the Minister wants better access to higher education, better quality, and more collaboration between the education fraternity and other institutions in civil society. Naturally, however, he differs from Prof. Habib in emphasising the role government still has to play in South Africa's education space.

The Minister believes government and industry should be working together, not constantly second-guessing each other. His plan for a sovereign fund on innovation in education is one tangible example of government's commitment to education and technological progress, to make a difference. This is how Minister Nzimande would improve TVET colleges, which he holds in his top three priorities on South Africa's education agenda. At the conference this year, there was therefore a call on industry to aid the education sector. There was also affirmation from a government that is very aware of how serious a problem it is that 3–4 million South African youth aged 18–24 are neither employed at present nor studying.



Although they never got the opportunity to engage each other at the conference, it seems that the Minister would have been open to the Witwatersrand vice-chancellor's suggestion that government incentivise industry to assist education by offering the private sector concessions. For example, telecoms companies could receive government permissions in exchange for fitting out all of the country's high schools with wi-fi.



In the end, all South Africans can probably agree that the private and public sector should be partners in improving our education, and with Professor Habib's idea that the **University of Cape Town**, **University of the Witwatersrand**, and **Stellenbosch University**, should all be collaborating to make South African higher education globally competitive, instead of trading off that higher purpose in exchange for a pursuit of their own higher rankings. Prof. Chris Brink would agree.



Closing

PwC's education conference challenged all delegates to think about the changing landscape South Africa faces in the education space, and helped many educators learn about the Fourth Industrial Revolution for the first time. The conference was concluded on a note of partnership between South Africa's different institutions in civil society.

Delegates were urged to focus on the rapid rate at which education is transforming, and on the effects of the Fourth Industrial Revolution in this space. To train people to adapt to a changing environment of innovation, agile adaptation is key, as well as an attitude open to possibilities. The workers of the future require skills for the future.

The need now is for humans to learn how to harness the technology of Industry 4.0, and this means finding practical ways to start moving forward. However, technology remains merely a tool for human creativity and the human spirit, the way a paintbrush is useless without an artist to hold it.

Let's keep our sights on the future and continue to make a difference by changing minds in a changing world, enabled by the upheaval of this exciting new world in beta, which we will explore at our next Education Conference on the 7th and 8th of September, 2020.



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