Meeting Highlights: Post-school Access Community of Practice

The Fourth Industrial Revolution: Preparing the workforce for the new world of work

Setting the scene

The world-of-work is changing, which raises important questions about how post-school education and training should prepare people for the new work environment.

Post-school education and training expert Suzanne Hattingh explored this topic at the BRIDGE Post-school Access Community of Practice on 12 October 2017.

The Fourth Industrial Revolution

The previous three industrial revolutions have been defined by the technological advances that enabled them, i.e. steam engines, electricity and computers. The Fourth Industrial Revolution refers to advanced technologies that have the potential to radically change the way we work and live our lives.

Some already existing examples of these disruptive technologies are the mobile internet, cloud computing, advanced robotics, artificial intelligence, driverless vehicles, renewable energy, 3-D printing, the automation of knowledge work, genetic engineering, nanotechnology, and the internet of things.

While the impact of these technologies may be largely positive, the Fourth Industrial Revolution poses serious challenges for society, and the implications for education and skills development are significant.
What makes the Fourth Industrial Revolution different from previous revolutions?

The Fourth Industrial Revolution has so much potential to bring about change because it is driven by a fusion of the technologies, which multiplies possibilities and increases their impact. Its two main characteristics are:

- **the speed of change**, as new technologies and the possibilities for using them evolve
- **the breadth and depth of change**, as the new technologies significantly influence the global economy, the way businesses operate, the way goods are produced, and the way we live, learn, work, communicate and manage our environment.

VIDEO: [https://www.youtube.com/watch?v=SCGV1tNBoeU](https://www.youtube.com/watch?v=SCGV1tNBoeU) [1:41]

How will the Fourth Industrial Revolution impact on work and organisations?

**Emerging trends**

Advanced technologies are already changing the nature of work and organisations. Some trends we are already seeing include:

- **Globalization**, where physical location is not important for many types of work (e.g. call centres, coding), and organisations can tap into talent anywhere in the world.

- **Mobility**, where work is no longer a place you go to, but something you do. Many people work in virtual relation to the organisation(s) they work for.

- **New behaviours**, where people and organisation use new ways to communicate, collaborate, share, access information and create content. This is changing how work is structured and organised.

- **Changing demographics and the influence of millennials**, who expect to work in ways that reflect their view of the world and how they interface with it.

Organisations that respond to these trends by creating workplaces where people want to work instead of simply as places where people need to work will have more success in attracting and retaining talented individuals.
A range of further changes has been predicted:

The 2016 World Economic Forum report on the future of work anticipates widespread changes that will cause major disruptions to the labour market. Some of these are:

- New kinds of work will open up, especially in technology, software development and social media.
- Many existing occupations will either change markedly, or disappear.
- People will do many different kinds of work during their working lives.
- Employment will take the form of short duration “work opportunities” rather than long-term careers.
- More people will work ‘remotely’, in their own space and time.
- More work will be done teams of people with different skills, who work together temporarily and use virtual communication to collaborate.
- Standardised, repetitive work is likely to be done by robots.
- Artificial intelligence and advanced robotics will change the interface between humans and machines.

The World Economic Forum has published a number of reports on the Fourth Industrial Revolution and its implications. Several reports focus specifically on the implications for Africa.

https://www.weforum.org/reports

What are the implications of these changes for working people?

In addition to the actual technical and occupational skills needed for their job roles, people will also need a variety of personal skills and attributes to manage their working lives.

- People will need to have a range of skills (‘basket of skills’) that enables them to adapt to new work situations and multiple job changes.
- Attributes such as creativity, adaptability and the ability to assess and evaluate situations will be critically important.
- People who work in virtual employment relationships will need to be self-directed, resilient and able to manage themselves and their activities.
- Lifelong learning will be essential for keeping up to date with new developments.

**Impact on society**

There is a real risk that the changes brought by the Fourth Industrial Revolution will lead to massive disruptions in society.
- Large-scale job losses will be a reality and unemployment can be expected to increase. In South Africa, low skill levels mean that there is a significant risk that people who lose their jobs to automation and the reorganisation of workplaces will not have the skills to benefit from opportunities created by new technologies.
- We can also expect personal trauma and social unrest as employees struggle to cope with the uncertainty and instability of the new work environment.

What will society need to put in place to assist the millions of people affected in these ways?

**The implications of the Fourth Industrial Revolution for education and skills development**

- How should we prepare people for the future work environment?
- What knowledge and skills will people need?

**Top 10 skills in 2020**

1. Complex Problem Solving
2. Critical Thinking
3. Creativity
4. People Management
5. Coordinating with Others
6. Emotional Intelligence
7. Judgment and Decision Making
8. Service Orientation
9. Negotiation
10. Cognitive Flexibility

“We are currently preparing students for jobs that don’t yet exist . . . using technologies that haven’t been invented . . . in order to solve problems we don’t even know are problems yet.”

[Attributed to Richard Riley, United States Secretary for Education under President Clinton]

These are some of the questions we have to answer:

- What skills should new entrants to the job market acquire if they don’t know what jobs there will be when they graduate?
- What should institutions be ‘teaching’, when information is freely available, and the knowledge students acquire is soon outdated?
- How do we equip people for multiple occupation or job changes?
- How should we prepare people to work in productive partnerships with smart machines?
- How do we prepare people to be lifelong learners, able to assess their knowledge and skills needs and to access the resources to develop them, in a process of continuous improvement?
- How do we prepare people to create their own work instead of preparing them for the job market (which requires much more than obtaining a formal qualification in entrepreneurship or being able to compile a business plan)?

The Institute for the Future lists these skills as essential for people to thrive in the unknown future workplace:

- **Sense-making:** the ability to determine the deeper significance of what is being expressed
- **Social intelligence:** the ability to connect to others in a deep and direct way, to sense and stimulate desired reactions and interactions
- **Innovative thinking:** the ability to come up with solutions that go beyond routine responses
- **Cross-cultural competency:** the ability to relate effectively in different cultural settings
- **Computational thinking:** the ability to translate data into abstract concepts and make sense of this information
- **New-media literacy:** the ability to evaluate and develop effective content using new media
● **Trans-disciplinary thinking**: the ability to understand concepts across multiple disciplines
● **Cognitive load management**: the ability to filter information for importance, and to use a variety of tools and techniques to derive maximum value from that information
● **Virtual collaboration**: the ability to work productively as a member of a virtual team

Adapted from Institute for the Future [http://www.iftf.org](http://www.iftf.org)

**How can South Africa’s education and training strategies and systems become more responsive to future needs?**

In what ways does the formal system have to change, in order to better prepare people for the disruptive technology-driven world of work that experts are predicting?

**Skills development policy, strategies and systems**

It is important for government, policy makers, employers, SETAs and educational institutions to recognise the urgent need for change and to support the new skills requirements. Here are some possible actions that organisations and individuals could take to raise awareness and drive action:

- Engage professional bodies to promote the new skills, and organisations such as Business Unity South Africa and Nedlac to drive action
- Advocate for non-NQF-aligned training that develops relevant new skills to be included in the BEEE points system
- Advocate for funding to be made available for training in the new skills across the post-school skills development system
- Shift organisational mindsets from a compliance-driven and credit-based approach to skills development to a future-focused approach that supports the acquisition of the new skill

**The occupation-directed skills development system**

The development and registration of occupational qualifications is a lengthy process involving multiple stakeholders. The rapid development of new occupations requires quicker mechanisms and greater flexibility. It will be important to:

- Streamline the qualification development and registration process
- Keep the OFO updated so that it reflects new occupations as they emerge
- Include future-focussed generic skills and emerging occupation and technology trends in occupational curricula
- Review and update occupational curricula regularly to keep them current

**VIDEO: Digital transformation: are you ready for exponential change?**

[https://www.youtube.com/watch?v=ystdF6jN7hc](https://www.youtube.com/watch?v=ystdF6jN7hc) [3:59]
CoP takeaways from the session

The need for / need to / importance of:

| Fostering social, emotional, ethical and spiritual development alongside the technological development |
| Researching unintended consequences of technological development, e.g. negative social, health or environmental impacts, and how to deal with these consequences in a coherent, open way |
| Ensuring that there will be holistic benefits that filter down to all sectors of our society – there is a risk that technological advances will become another way to separate people and will result in those who are already struggling being further down trodden |
| Avoiding 'either/or' thinking and embracing technology within a framework that protects society from negative and unintended consequences |
| Recognising that our standardised education will not teach learners the skills needed in future, and that we need to change our systems and our thinking around learning, curriculum, and training |
| Finding ways to create learning opportunities and authentic tasks that build learners’ capacity for innovation, creativity and adaptability, and upskilling teachers in these methods |
| Government and big business to accept that they have to play a crucial role in preparing for this changing future by providing enabling policies and putting money in the right places. |

“There is a generation of people – the millennials – who intuitively understand the new technologies and the opportunities they offer. Working as I do in a workspace with a mix of millennial and older people has shown me that this makes for cross-pollination and innovation, and the two speak to each other. There is an aspect to young people that isn’t trained in the past, so just introducing them into a workspace is one way of encouraging creativity in an organisation. Can this be transposed to what happens when we train teachers?” **Sarah Lubala, BRIDGE**