



WORLD OF WORK/FUTURE OF WORK STRATEGY GROUP

A discussion at the June 2017 Board meeting resulted in the idea that due consideration be given to the idea of developing a new USAf Strategy Group. This arose out of discussions between USAf and SATN about the establishment of a platform to focus on areas that spoke with some vigour to the special role of the universities of technology in our system. One such area is the *World of Work*. Needless to say, there will be significant overlap of interest with the traditional and the comprehensive universities.

To begin with, it is recommended that four areas of work in this strategy group be considered.

1. Pathways for Creating Learning Opportunities at the Theory-Praxis Nexus

Universities of technology already engage in high levels of Work Integrated Learning (WIL) and Co-operative Education which essentially provide for a structured approach to creating the opportunity for students to learn at formally constructed theory-praxis nexuses. These are usually assessed and credit bearing and are a required component for graduation either with a diploma or a degree. While there have been, and are, interesting research and developmental work done on WIL and Co-Op this has not yet been an important part of the work at USAf. It is an area of engagement rich in potential as being transformative of the learning process. Universities of technology invest heavily in the creation of institutional platforms to support WIL and Co-Op and there would be significant to be gained by trying to understand better what the value of this investment is.

The health sciences provide another example of such a theory-praxis network which is usually intricately interwoven into the curriculum as students oscillate between the classroom and the work environment on a regular basis. One might think of the Medical Internship, a requirement for the registration of an individual as a professional doctor (for instance) as a capstone experience where practice under tight supervision becomes the primary mode of learning.

Each programme of professional education and training areas has its own approach and some are more effective than others.

Service-Learning (SL), community-based learning (CBL) and voluntarism provide other opportunities for students to engage in learning at these nexuses. There have been attempts to build this into curricula in more formal ways. The traditional challenge has been that these learning projects have been funded through 'soft money' resulting in them being episodic and dependent on the whims of funders.

Each of these has its own internal and external dynamics that require different approaches of design and execution. However, all of them require engagement with employers.

It may be argued that this line of work belongs in the Teaching and Learning Strategy Group (TLSG). There are four primary reasons for this line of work to belong to this strategy group rather than in the TLSG.

- The one thing common with all of these learning modalities is the need for significant, negotiated engagement between the university and employers and/or communities around the idea of creating **work-based** experiences for students. This is an important consideration in the sense that it provides the basis for experiments on the integration of new approaches to work into these experiences.
- There is significant evidence that students who have some form of WIL, Co-Op, CBL or SL experience have advantages in job placements. This is an indication that employers see this kind of experience as valuable and this amplifies the need for engagement over design. One might argue that this is an area that universities and employers must work together synergistically.
- These forms of learning require considerable institutional capacity to sign-up 'employers' as potential sites. There are lessons to be learnt here both locally and globally. A part of this discussion has to do with whether there is need for the development of a shared services platform to provide a regional or national facility to enhance the capacity of universities to roll-out such learning activities effectively.
- Are there discussions to be held between higher education and industry about new forms of a learning-working paradigm? For instance, is it possible that students are employed on the basis that they spend 50% of their time at work and 50% of their time on campus?
- Changes in the very nature of work as a function of technological changes will have significant implications for ways in which we would have to think and design work-based learning experiences for future generations of students.

These provide sufficient cause for research and design work related to the creation of these theory-praxis nexuses to be addressed within this strategy group.

2. The Sociology/Psychology of Work as Large Transformations Occur in the Workplace

There are significant changes taking place in the world of work that have enormous consequences for the way in which universities shape their own internal functioning and in the way in which students are prepared for the labour market. Indeed, these technological changes will in all probability induce fundamental changes in the very nature of traditional labour markets. Some of these are listed below.

- (a) Most individuals in the workforce will hold 6 or more jobs during their working lives. This will be facilitated by the diversification of the route for job progression from what is referred to as the traditional ladder model (vertical progression from job to job) to the newer lattice model (progression through a combination of sideways and vertical progressions) in a labour market that is more flexible, integrated and networked.
- (b) Workplaces, especially in the new technology spaces, have moved dramatically from management hierarchies to grid-like structures. Career paths are much more fluid. New style workplaces will have high levels of 'intrapreneurship', something that is demanded by millennial employees.

- (c) Workforces are significantly more diverse in terms of technical, management and leadership skills, resulting in a significant ‘flattening out’ of work structures.
- (d) The development of the *human cloud* is another example of how workplaces are undergoing revolutionary change. The human cloud is a reservoir of freelancers who work on demand on digital and non-digital tasks. McKinsey estimates that 540 million people will have participated in such work by the time we get to 2025. India and the Philippines are the largest markets for the human cloud. And it is clearly just a matter of time before this becomes reality in the local labour market.
- (e) Workplace monitoring is also shaping new approaches to the world of work. Employers sometimes require their employees to wear devices that report on their exercise schedules, what they are eating, etc. And sometimes employees volunteer their desire to be monitored.
- (f) The end of retirement is in sight.

These are no longer just management fads. They occur in reality. Consider for example the emergence of zero-hour contracts in the UK which allow employers to place employees on call and which gives employees the opportunity to operate in the human cloud.

Much of this is still very new and much research and development is required. There are implications for the way in which our institutions are organized and for the kinds of graduate attributes we cultivate in students. And there are implications for our teaching and learning programmes.

Once again, at the heart of this line of work at USAf will be a major engagement with local and global employers who are shifting gear in these directions.

3. Implications of the emergence of a Digital Economy and Society:

The digital revolution that had its first major impact in the domain of information and communication technologies (ICTs) some decades ago has begun to effect major changes in other spheres of material life, including economies. This includes, inter alia, embedded sensors and smart materials, the Internet of Things (IoT), robotics, automation, and Artificial Intelligence (AI). Made possible also by advances in Big Data and machine and deep learning, the new wave of technological changes are bound to have far-reaching consequences for the structures and modes of production of goods and services on a planetary scale. Of particular concern is the enormous progress that is being made in the areas of artificial intelligence (AI), automation and robotics. On the one hand, there are deep concerns that millions of jobs will be wiped out. On the other hand, progress in AI and robotics is seen as being at the heart of the 4th industrial revolution with enormous opportunities for societies and economies such as ours, including the prospects of new types of jobs and conditions of work. What are some of these new technologies?

- Automation is rapidly expanding through workplaces. Its reach is across the work spectrum.
- This is likely to result in a radical change in the world of work and local and global labour markets with millions of jobs currently being done by human beings being taken over by increasingly intelligent machines and robots. Worldwide it is estimated that some 45 – 75 million jobs will be reassigned to machines by 2025.
- The role of robotics and augmented intelligence (as opposed to AI) in production processes is already well established in certain sectors of the economy (such as the automotive assembly plants, Amazon and Google), but fully matured AI will have more dramatic and far-reaching implications for production systems. While

currently heavily deployed in the heavy and light manufacturing sectors and in the fabrication and execution of the military-industrial complex they will increasingly be deployed in areas where repetitive human actions and/or judgements are deployed, including sophisticated interventions for instance in the biomedical sciences. This will have enormous implications for the future of human work. Already autonomous cars are being tested and used, computers that 'talk' to you are available, rudimentary diagnostic systems are being developed. These are already a part of our everyday existence and are a harbinger of what is to come.

- The continuing development of algorithms that convert computers into machine learning devices has enormous implications for the world of work. If we link this with the emergence of big data, then this has enormous implications for jobs. A significant part of the labour force is engaged in work that is repetitive and predictable. These jobs will be at risk.

According to Jerry Kaplan "Automation is fundamentally the substitution of capital for labour. The problem is that the people who already have the capital are the ones who will benefit most, because they're the ones who will invest in the new automation." The important point here is that automation is effectively the replacement of labour by machines.

These emerging changes raise a number of crucial challenges for universities. Firstly, and taking into account the open and industrially-dependent nature of the South African economy, how widespread and deep-going will digitization, AI and robotics radiate their effects throughout the South African economy in decades to come. Secondly, how can we best develop models to predict some of the most obvious disruptive changes in key economic sectors and its social implications? Thirdly, how do we bring together the leaderships of government, industry and universities on a long-term basis to track these changes across key sector and explore adaptive responses? Fourthly, how do we build an understanding of the disruptive technologies into curricula and training of students across the university system?

The key question is how do we ensure that South Africa is not caught on the sidelines of the 4th industrial revolution. It is probably true that this is a cliché but the reality is that these developments have enormous capacity to completely revolutionise the nature of work and the nature of employment.

4. Graduate Employability, Employment and Entrepreneurship

USAf requires the capacity and facility to measure on a regular basis the rates and modes of employability, employment and entrepreneurial uptake of the sector's graduates and the extent to which there is a match between inputs, outputs and absorption. It should also give us better indications of new areas in which our graduates are finding meaningful employment and entrepreneurship opportunities, especially in view of the 'new' economic transformations suggested above. While we are in negotiations with Stats SA to understand its willingness to add this kind of data collection to its annual General Household Survey there will still be need for analysis, policy development and advocacy work.

Recommendations to follow on next page.

Recommendations:

1. It is recommended that such a strategy group which we might refer to as the World of Work or the Future of Work Strategy Group be established.
2. Careful consideration is given to what other work may be ceased to allow this strategy group to be properly serviced. At the moment, just two members of staff are involved in servicing 4 strategy groups, about 9 communities of practice and a number of large projects.
3. A workshop be convened before the end of 2017 that would bring together interested researchers and experts to flesh out the programme.
4. The programme of work together with terms of reference and composition will be submitted to the first meeting of the EXCO in 2018.
5. It is suggested that the chair of this strategy group be a vice-chancellor of one of the universities of technology.

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