From Digital Disruption to Educational Excellence: Teaching and Learning in the Knowledge Economy

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Abstract: Three cultural forces have shaped and framed higher education in the last twenty years: economic changes, technological changes and the increased speed and mobility of people, goods, money and ideas. Public institutions have managed a decline in public funding, requiring commercialization and private partnerships, alongside changes in the labour force through casualization and short term contracts. Digitization has enabled disintermediation and deterritorialization. The power relationships in knowledge dissemination have flattened through the changes to publishing and social media. Traditional, industrial supply chains have collapsed. There is little need for middlemen and agents. This article reflects on the changes to higher education in the last twenty years and how they provide exemplars, warnings and beacons for the radical transformations in the post fordist, post-Global Financial Crisis economy. Policy development is often disconnected from the social reality of working in - and gaining services from – the health and education industries. This article contributes to a free and robust dialogue, enabling collaboration and debate about what went right and wrong in higher education in the last two decades.

Keywords: Higher Education Studies, Disintermediation, Deterritorialization, Digitization, Neoliberalism, Global Financial Crisis

1. Introduction

Education and health do not nest comfortably in this accelerated, digitized, consumerist age. Both are goods and services, public and private, industrial and post-industrial (Pucciarelli & Kaplan, 2016). The key debates of our time spark through the health and educational industries. Whether it is financial transparency, concerns with privacy (Dinev, Albano, Xu, D'Atri & Hart, 2016) or big data, education and health workers ride a wave of innovation and opportunity that is pervaded by the challenges of technological change and social responsibility.

This article reflects on the changes to higher education in the last twenty years and how they provide exemplars, warnings and beacons for the radical transformations in the post fordist, post-Global Financial Crisis economy. This is a profoundly useful exercise. The horizontal integration and dialogues between health and education as fields, sectors and industries are important and resonant. At their closest, health and higher education conflate in the discussion of health education, medical education, nursing, midwifery and dentistry. Both sectors share a great deal. They have been buffeted by under-tested and over-marketed technological change. Policy development is often disconnected from the

social reality of working in - and gaining services from – the health and education industries. This article contributes to a free and robust dialogue, enabling collaboration and debate about what went right and wrong in higher education during the last two decades.

The argument in this article is clear. Three cultural forces have shaped and framed higher education in the last twenty years: economic changes, technological changes and the increased speed and mobility of people, goods, money and ideas. Public institutions have managed a decline in public funding, requiring commercialization and private partnerships, alongside changes to the labour force from casualization and short term contracts. Digitization has enabled disintermediation and deterritorialization. The power relationships in knowledge dissemination have flattened through the changes to publishing and social media. Traditional, industrial supply chains have collapsed. There is little need for middlemen and agents. Consumers buy directly from producers. The radical changes to the music and software industries are key exemplars. Real estate is the outlier industry, with real estate agents still engaged for the selling of a house, noting that online searching for those houses is now integral to the market. Deterritorialization has enabled the movement of digital goods and services over national boundaries with ease. All industries are international industries. All information, goods and services can attract an international audience. This is an accelerated culture (Redhead, 2004). That which is fast dominates that which is slow (Virilio, 1989). This accelerated knowledge economy was catalogued and predicted two decades ago by Charles Leadbeater in his 1999 book *Living on Thin Air* (Leadbeater, 2000). In this book, he argued that all industries will be punctuated by three characteristics: branding, skill development and design.

2. The Fourth Industrial Revolution

Macro industrial changes have been described as the fourth industrial revolution. The impact on higher education of these transformations was and is immense. As with health, the new languages of the new economy were uncomfortably hooked into higher education. Students became customers. Patients became clients. For many reasons, this language did not fit the behaviours and protocols of these industries. A key rationale for this misfit of language is the nature of the 'product.' If students are consuming knowledge, then they are buying a degree. Concerns with quality assurance rightly follow any sense that money is exchanged for qualifications. Similarly, the notion that patients are consuming health, and clients are buying health products and services – in the form of time from professionals – is also disconcertingly constituted.

Education and health are taken-for-granted variables in our culture. They only become a problem when confronted by their opposites: ignorance or sickness. Most of the time, most people are well enough and smart enough to blend into the patterns of daily life. That means the key functions of preventative health, primary health care providers, early years learning, and primary, secondary and tertiary teaching are invisible. Occasionally, a procedural breach emerges at a regional or metropolitan hospital. Occasionally, a plagiarism scare emerges in an Australian university. But most of the time, education and health are punctuated by motherhood statements. Scholars may agree that they are 'good,' but rarely reach consensus on what modern, effective, productive and high quality education and health should look like. This challenge was only increased through the arrival of Dr Google (Abbott, 2010) and his higher education colleague, Professor Google. E-health offers incredible opportunities, few of which are accessed when prospective clients search online for how to manage a headache, only to walk away from

the search believing they have a brain tumour. E-learning reveals remarkable opportunities, few of which are realized as students' google their way through an assignment instead of accessing quality refereed literature (Brabazon, 2007; Brabazon, 2013).

Universities have not managed Google effectively, through a systematic lack of early, preventative information literacy programmes. The story of how higher education has managed disintermediation, deterritorialization and speed through the 'revolution' of online learning in the last twenty years is a tale of failure, missed opportunities, absent leadership, spin and marketing replacing thoughtful teaching and learning. Universities deserved the arrival of MOOCs and while the MOOC moment is over, it was one outcome of two decades of mis-aligning digitization, learning and teaching.

The mid-1990s saw the arrival of online learning in a basic form through most universities. This was signalled through the purchase of a learning management system, such as WebCT. Blackboard, Moodle and Canvas were to follow. These interfaces were simple, facilitating a cut and paste of analogue study guides and materials into a screen-based environment. Professional development programmes were lacking. Teachers treated the screen like a piece of paper, transposing old ideas into new media.

In the desire to 'get materials online,' a series of hardware and software options emerged that did not require academic staff to change their behaviour or learn about new ways of teaching. The focus was on hardware and software, rather than wetware. Technological change did not promote changes in the theories of learning. Because academics had not been trained in the software or hardware, they could not be trusted with digitization. Instead of staff being empowered to turn on a system to data capture a lecture, universities bought Lectopia which was supposedly an idiot-proof – or academic-proof – system that would start a camera at an appointed time, turn off a camera at an appointed time, and load the resultant MP4 file to the university system for distribution via WebCT or Blackboard (RMIT, 2016). Through such a system, analogue lectures were digitized. Research showed that the majority of students did not watch them, and certainly did not watch them all (Karnad, 2013). But as a consequence, attendance at lectures declined, with the promise of watching a poor quality digitized lecture, captured from a static camera, enough to keep students in bed or in the coffee shop.

This is the story of the first decade of online learning in universities: assuming academic staff could not manage the technology, mainly because professional development had been neglected on the premise that hardware and software could automatically move variable quality analogue material into a digitized form. Significantly, when these two variables collided, resulting in a large amount of low quality and dull online materials delivered through a bland and standardized template, the solution was not to invest in the education and the professional development of staff. Instead, a new group of employees emerged in universities: education designers. This group did not hold advanced qualifications or expertise in content. But they knew how to insert material into learning management systems. So instead of disintermediation – academics developing content to engage directly with students – another layer of mediation was created.

The mistake of the late 1990s was to underestimate academics and overestimate technology. As Linda Leung (2008) confirmed, universities did not make the "conceptual leaps from users to learners" (p. 15). As Leadbeater predicted, the characteristics of the business world that would work well in the knowledge economy required investment in branding, skill development and design (Leadbeater, 1999,

p. 10). Universities neglected all three. Instead of investing in staff, educational designers were brought in to separate form and content, learning and technology. A change was coming – often reified into the description of the read-write web or Web 2 – where staff would gain digital literacies in platforms and applications that left the learning management systems clunky, obsolete and redundant. Predicted by the grandfather of social media – blogs – interfaces simplified and allowed users (including academics) to learn skills in their leisure time that would then be applied in their working life. Facebook, YouTube, LinkedIn, Academia.edu, Pinterest and podcasting, to name a few applications, widened the online experiences of academics (and all digitally literate consumers) so that as Moodle started to increase its market share against Blackboard, the open access and free materials could – with ease – be inserted into its modular construction. Rich born-digital materials could be created with smart phones and bespoke platforms like the – now obsolete – Cisco Flip Camera and the Zoom range of microphones. The professional development neglected within universities no longer mattered by the 2010s because leisure-based experiences had plugged the gap. In a BYOD university world, academics and students were also bringing their own literacies (BYOL). This situation has left a group of educational designers without a function and a long-neglected professional community – librarians – who were seemingly rendered redundant by Google are now the core intellectual group to manage academic integrity in higher education.

Mistakes were made. Professional development was lacking. New job titles were invented. The excitement for technological change did not match the hard work required to embed it into systems for teaching and learning. The phrase 'disruptive technology' was and is used as an excuse to blame the software and hardware for a lack of attention to managing organizational, economic and social change or as a synonym for progress (McKenzie Global Institute, 2013). In this article, digital disruption is used with more nuance, as a method and strategy to manage change through understanding the history of technology. It also activates the emerging literature on leadership in digitally disrupted industries (Bolden and O'Regan, 2016).

3. The Lifecycle of Technology

Rather than disruption, a more effective metaphor and model to understand technological change, with particular appropriateness for education and health, is the 'lifecycle.' The first use of 'lifecycle', in relation to technology, dates back to 1957 and Iowa State College (North Central Rural Sociology Committee, 1957). The phrase was used to monitor the purchasing patterns of seed corn by farmers. This report found that the well-educated and wealthy farmers on larger than average farms were the technological innovators. The laggards were the least educated and the oldest. From this early use in agricultural innovation, this lifecycle modelling has been used to understand technological innovation and particularly the lifecycle of hardware and software.

From that first study of how farmers implemented change in their farms, a series of famous research projects emerged. Everett Rogers created his bell curve that represented the take up of new products, spanning from innovators to laggards (1995). G.A. Moore provided the explanation as to why Apple's products and marketing were successful in the last decade. Moore argued that early and late adopters – innovators and laggards – require very different marketing techniques (Moore, 1991). As revealed by

Apple, to enable a change in technology required – first – a change in culture. Universities did not learn this lesson. The technology was decontextualized.

Understanding changes in agriculture provided a foundation to understand technological change in other industries. This model of innovation was enhanced by Gartner. Gartner transcribed the 'life cycle' into the "Hype Cycle." They locate five key phases.

Technology trigger

Peak of inflated expectations

Trough of disillusionment

Slope of enlightenment

Plateau of productivity (Gartner, 2017).

If a product survives the 'trough of disillusionment,' where the technology does not deliver on the promise marketed to the buyer, then it enters 'the slope of enlightenment.' Second and third generation products emerge at this point. This is not a progressive ideology. Technological change does not always signify technological progress. After the Global Financial Crisis and the slow 'recovery' in many regions of the world, financial systems that operated so well in a boom seemed exhausted. Like all recoveries, there needed to be a mobilization of experience to ensure that every innovation was tempered by accountability. As James Gleick (2011) diagnosed, "we have information fatigue, anxiety, and glut" (p. 11). In an age that requires a balancing of cost, value and risk, doing more with less, the fast consumption, fast fashion and fast techno-obsolescence have continued.

Education is buried under hype cycles. The 'trough of disappointment' continued through much of the 2000s. Only now, as cheap, high quality domestic software and hardware has infiltrated our homes, have better quality learning materials emerged from our universities. Such a delay – with universities wedded to over-patched learning management systems that appeared positively medieval in comparison to Google and Facebook – meant that spaces were left for alternative modes of learning and alternative business modes.

MOOCs were the most obvious and famous of these alternatives. While MOOCs – appropriately - have now moved through their own hype cycle and are currently dwelling in the 'trough of disillusionment,' they were a powerful diagnostic guide through the errors, mistakes and cul-de-sacs of higher education. The phrase Massive Open Online Course was first used by Dave Cormier in 2008 (2008). He was developing an educational method, based on connectivity that would enable teachers and students to continue to learn beyond the parameters of a single subject or course (Wiley, 2008). What has emerged is a standardized template of videos delivered by academics which is watched by students and peer-assessed work is the mechanism for evaluation. The problems are clear. Completion rates range from 5-20% (Sahami, Martin, Guzdial & Parlante, 2013). Rates of failure and withdrawal are higher than in face-to-face learning modes (Malan, 2013). Fascinating unexplained results emerged, such as achievement gaps for male students (Jaggars, 2013). However MOOCs fed into a long-term discussion of lifelong learning, now tethered to the knowledge economy.

4. The Business of Learning

Learning is a big business. Whether discussing the University of the Third Age, personal development courses, LinkedIn microlearning programmes, self-help bestsellers or hard-edged vocational qualifications, definitions of learning – let alone education - are expanding. MOOCs also worked well with the transformation of casualization and contract-based employment in the post-Fordist workplace. The responsibilities for training were redirected from the workplace to the individual. Instead of funding a training scheme in businesses, there has been a devolving of skill acquisition and personal development. Through the twentieth century, and particularly after 1945, education was the track to social mobility. The difficulty now – with degree inflation and the loss of stable, secure, long-term employment – is that new modes of exclusion and disempowerment are being perpetuated through the education system. John Field (2000) recognized that "the new adult education has been embraced most enthusiastically by those who are already relatively well qualified" (p. 105). This is a significant realization. Motivation, meta-learning skills and curiosity are increasingly being rewarded when found in the already credentialed, empowered workforce. Those already in work undertake lifelong learning.

If success is individualized, then failure is also cast on the self, not the social system or policy. The disempowered are blamed for their own conditions and 'failures.' After the Global Financial Crisis, such tactics were intensified, with a lack of 'austerity' blamed for the contraction of international economies, rather than an under-regulated banking system. The concern, through the internationalization of the workforce, technological change and privatization of national assets, is that failure in formal education results in social exclusion and immobility. Technological change has not widened participation in higher education. It has enabled the already educated to increase their expertise and improve their job prospects.

The knowledge economy is based on a learning society, citizens who embrace change and the skill development required to manage it. But this is not learning for its own sake. Short term vocationalism in educational policy speaks to the ordering of our public culture, requiring immediate profits and a tight dialogue between education and work. Furthering this argument, if education 'creates' employment, then it also 'creates' unemployment. Ironically, in an environment that focuses on the multiple identities and roles of citizens, students are reduced to one label – 'future workers.' Education has always been marinated in the political directives of the day. The industrial revolution introduced a range of technical complexities to the workforce. Fordism necessitated that a worker complete a task with precision and speed, requiring a high tolerance of stress and boredom. Now, more skills are 'assumed' by employers at the time that workplaces are displacing their training expectations to the post-compulsory education sector. MOOCs were one outcome of this displacement.

The last twenty years have witnessed an expanding jurisdiction and justification of the market. As part of Tony Blair's third way, the creative industries and the knowledge economy became catchwords to demonstrate that cultural concerns are not only economically viable but a necessity in the digital, post-Fordist, information age. Such market imperatives offer both challenge and opportunity for teachers, researchers and students.

In British policy, and increasingly in Australia and carried by the word 'innovation,' attention is placed on industry-based research funding to address this changing environment. In 2000, Stuart Cunningham and others listed the eight trends that order education, teaching and learning in this new environment.

Table 1: Eight trends that order education, teaching and learning in the new environment

The changes to the provision of education
Globalization
The arrival of new information and communication technologies
The development of a knowledge economy, shortening the time between the development of new ideas and their application.
The formation of learning organizations
User-pays education
The distribution of knowledge through interactive communication technologies (ICT)
Increasing demand for education and training
Scarcity of an experienced and trained workforce

Source: S. Cunningham, Y. Ryan, L. Stedman, S. Tapsall, K. Bagdon, T. Flew and P. Coaldrake, *The business of borderless education,* (Canberra: DETYA Evaluation and Investigations Program [EIP], 2000)

The subsequent 17 years has shown the accuracy of their predictions. Universities did not have the dynamism and mobility to react to these changes at the required speed. Instead of leading with innovation, universities are moving from a place to learn and into "supplying high value-added inputs to other enterprises" (Hartley and Cunningham, 2002, p. 5). There are costs and losses through such a shift. The assumption within this table is that the areas of expansion in the workforce are located in the knowledge industries, the creative industries and the service industries. Indeed, the overlap between these sectors is rarely specified. The knowledge economy is the new service sector. This new economy makes specific demands of education.

Table 2: Education in the 'old economy' and the 'new economy'

Old Economy	New Economy
Four-year degree	Forty-year degree
Training as a cost	Training as a source of competitive advantage
Learner mobility	Content mobility
Distance education	Distributed learning
Correspondence materials with video	Multimedia centre
Fordist training - one size fits all	Tailored programmes
Geographically fixed institutions	Brand named universities and celebrity professors
Just-in-case	Just-in-time
Isolated learners	Virtual learning communities

Source: T. Flew, "Educational media in transition: broadcasting, digital media and lifelong learning in the knowledge economy," *International Journal of Instructional Media*, Vol. 29, No. 1, 2002, p. 20

Flew's table is powerful and disturbing. The outcome of this change from the old to the new economy is the delivery of online, short courses. Microlearning – or nanolearning – confirms that this prediction has indeed emerged. Ten years after he published this table, the MOOC arrived. Flew (2002) described the product of this system as a "learner-earner" (p. 50). This 'forty year degree' is based on lifelong learning ideologies. The effect on the 'learner-earner' in having to earn more to privately fund a continuance of learning – to ensure that they keep on earning – presents long term consequences to the housing market, family structures and leisure time. The costs of education will impact on other sectors of the economy and private lives. Also, there is little attention to the groups who are outside this taken-for-granted commitment to learning. Flew (2002) noted that,

> barriers to greater participation in education and training at all levels, which is a fundamental requirement of lifelong learning in the knowledge economy, arise in part out of the lack of provision of quality technology-mediated learning, and also from inequalities of access to ICTs, or the 'digital divide' (p. 51).

In such a statement, there is a misreading of teaching and learning. Such confusion is fuelled by the untheorized gap between 'student' and 'consumer.' The notion that technology (which in this context too often means computer-mediated platforms) is a barrier to education does not explain why conventional distance education courses, utilizing paper, ink and postage, were also unable to welcome or encourage groups disengaged from formal learning to attain a university degree. Flew and others do not confront the issue of motivation, or the reason why citizens choose to add or remove the label of

'student' from their bag of identity labels. The emphasis on technology through the 2000s as both a panacea and problem for lifelong learning did not explain why students desire to learn, beyond economic necessity and employer expectations.

Based on these assumptions of an expanding knowledge economy and lifelong learning, the shape of education is warping (Piketty, 2014). An ageing population requires educational expenditure to be reallocated from primary and secondary schooling and towards post-compulsory learning and training. This cost will also be privatized. When coupled with immigration flows, technological changes and alterations to market and labour structures, lifelong learning presents a profound and personal cost. An instrument for economic and social progress has been individualized, customized and privatized. The consequence of the ageing population in many nations including Australia, particularly when confronting nationalist policies and political parties undergirded by racism, is that there will be fewer young people in schools or employment. Such a shift will be seen in both the workplace and taxation system. Similarly, those young workers who remain will be far more entrepreneurial and less loyal to their employers.

The future work force is starting to crystalize, along with its long term challenges and risk (Bowman, 2014). A small, well- educated and permanent core of employees will be encircled by a large contingent of part-time, contract and casualized staff. The challenge is that this transitory labour force will need to be well educated, experienced and ready to commence specialist tasks on demand. Education and training will be crucial at post-secondary levels, but the burden of this education will not be placed on the private and public sector that require these ready-made employees. Similarly, the nation state's contribution to public education is in decline. Therefore individuals will be paying for lifelong learning and degrees so that they are able and ready to take on a part time or contract position (Verhaeghe, 2012). Guy Standing has labelled this group, "the precariat" (2013).

5. Megatrends from the 2010s

From this diagnosis and discussion of the mis-steps, flawed decision making and faith in technology rather than education and training in the last two decades, it is valuable to deploy an analysis of megatrends to recognize and evaluate the future scenarios for the workforce. In January 2016, the CSRIO published one such analysis, offering a shape and vision for the next twenty years in Australia's working history (Hajkowicz, 2016). They isolated particular avenues requiring change:

Digital technology disruption
Growth in computing power
Growth in device connectivity
Development of the disintermediated (P2P) marketplace
Growth in platform economics
An ageing population
Diversification of Australian economy beyond the mining base
Growth in the service economy
Growth in the knowledge economy

From these drivers, six megatrends were isolated

> The second half of the chessboard
> Porous boundaries
> The era of the entrepreneur
> Divergent demographics
> The Rising bar
> Tangible intangibles (Hajkowicz, 2016, pp. 31-57)

The language used to describe these megatrends was not descriptive, but delving into the detail, '**The second half of the chessboard'** described the increase in device connectivity through the Internet of Things (IoT), alongside an increase in computing speeds, data creation and movement. Further, data will increasingly be activated on mobile devices (Woodie, 2014). This proliferation of data is accompanied by the challenge / threat / opportunity of many occupations being automated. Consider typists, bank tellers and switch board operators. Automation increases productivity and also wipes away entire categories of employment (Tripathi, 2016). This is not new. John Maynard Keynes described this process as "technological unemployment" (Keynes, 1930). He used that description in 1930. The CSIRO report predicted that 44% of Australian jobs will be erased or radically transformed through computerization and automation (Hajkowicz, 2016, p. 7).

'Porous boundaries' recognizes the impact of disintermediation and platform economics in creating a different type of workforce, with an expansion of freelancing, a small core of staff and a large portfolio worker community. The physical working environment will change through hotdesks and co-working spaces. The peer-to-peer market will be enabled through an array of online services that are already emerging. These include Upwork, Kaggle, Innoventive and Freelancer.com, where employers and freelancers can meet. However, the generalizability of the Air BnB and Uber model is debateable.

The third megatrend was locating '**The era of the entrepreneur**.' The CSIRO team realized that, "The ideal job within a large organization may not be awaiting an increasing number of future job seekers. This means individuals will need to create their own job" (Hajkowicz, 2016, p. 9). The fourth megatrend was '**Divergent demographics**,' which recognized the ageing population, increased life expectancies and increased retirement ages. The importance of immigration, with migrants arriving into a country at younger working ages, was also confirmed. The fifth megatrend – '**The rising bar'** – has direct consequences on the future of education. With increasingly automated systems and the lower skilled jobs being outsourced or deleted, the necessity for higher education to maintain national and international competiveness is clear.

The final megatrend was '**Tangible intangibles**.' This trend impacts on both health and education. The CSIRO team recognized that an area of employment growth was not through the Internet of Things or the ambiguously described 'new economy.' It was health and education. It is important to focus on the language CSIRO used to describe our sectors.

> Employment growth in the service industries, in particular education and healthcare, has driven job creation in recent times. This is likely to continue into the future as we move to a knowledge economy. Service sector jobs requiring social interaction skills and emotional intelligence will become increasingly important (Hajkowicz, 2016, p. 10).

Note the ambiguous relationship between 'service industries' and 'knowledge economy.' Indeed, what is the relationship – and differences – between the new economy, knowledge economy and service economy?

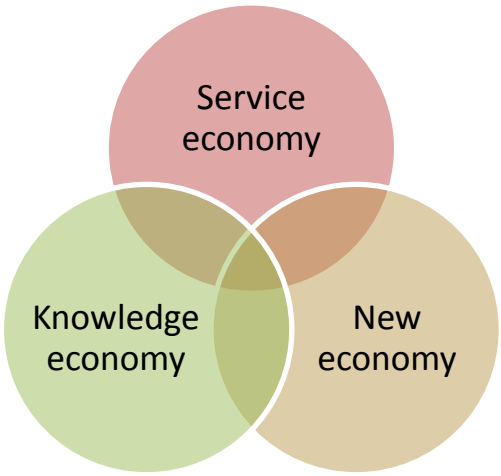

Figure 1: The relationship between the new economy, knowledge economy and service economy

Health and education slide through these spheres and categories. Further, the technological innovations in these sectors are unmentioned, instead prioritizing 'social interaction skills' and 'emotional intelligence.' Is the wider suggestion here that health and education 'service' the knowledge economy, rather than become an integral component of it? Such a realization is significant, as the Report confirmed that the highest growth in employment by 2019 will be Health care and social assistance (18.7%) and Education and Training (15.6%). These are the greatest increases in any employment sectors presented in the report. Yet because these industries are not defined as 'new' or 'creative,' they are not configured as innovating or innovators.

The challenge in this report is that innovation and growth are tethered to a particular type of mobile, data-heavy technology. The extraordinary developments in medical technology, health technology and the considered integration of sonic and visual media in contemporary teaching and learning are lost because of definitional ambiguity. The authors of the report separated the 'service sector' from 'the knowledge economy' and technological innovation.

> Education and training are becoming even more important. There will be fewer and fewer jobs within the service sector of the economy – within which the bulk of Australians are employed – which do not require skills, and / or training qualifications (Hajkowicz, 2016, p. 13).

What are the policy implications of these megatrends? Because the report made the definitional mis-step in defining the service sector, the consequences for economic and social policy development are ambiguously constituted. The first correction must be that health and education are understood as creative, knowledge-driven, diverse and dynamic industries. The third largest export industry in Australia is made up of full fee paying international students. Medical technologies, particularly clustering in Adelaide at the moment, involve partnerships between universities, health professionals,

health providers, researchers and private and public organizations and companies. Health and education do not (only) service the economy. They are the punctuation of the knowledge economy. They are also the punctuation for the present and future workforce.

All professions are digital professions. It is time that technology is considered, not as a 'thing' or a threat, but as a model for thinking about change, connection and community. Employment and employees are at risk through automation and digitization. However, the megatrend report confirmed that health and education are not the professions at risk. Clearly, there are lessons to learn from digital history not recognized by the CSIRO Report. New alliances must be developed between education and health, universities and industries, the public sector and the communities scholars serve.

Researchers have much work to do. The megatrends survey also confirmed an interpretative gap for Australian workers between their perceptions of health and their actual health. While Australian workers consider themselves healthy, chronic diseases are increasing, as are mental health concerns (Hajkowicz, 2016, p. 48). Where the CSIRO megatrends report mis-stepped was in its understanding of education. The researchers had not learnt the lessons of twenty years of mistakes, poor policy and wasted money and opportunity in e-learning. They also did not recognize the post-MOOC landscape. They stated that "online education is likely to complement university education" (Hajkowicz, 2016, p. 52). Actually online education is university education. The future of teaching was described as "less instruction, more mentoring in their life-long learning process" (Hajkowicz, 2016, p. 52). Mentoring is experiential. Innovation requires expertise that is verified and propelled by international standards. There has never been more to learn. Over ten thousand books are published every single week. There are 37,000 journals listed in SCImago. High quality teaching and learning, with innovative, rigorous and contemporary curriculum delivered with proven learning theories and tested through quality assured assessment, is the means through which universities deliver outstanding graduates to businesses and public organizations.

While megatrends for further and higher education are becoming clear, the consequences on health are more difficult to draw. Angus Deaton's *The great escape: health, wealth and the origins of inequality* (2013), recognized that inequalities in wealth are also inequalities in health. Health and wealth – as variables – shape and shadow each other. After the Global Financial Crisis, and the mistakes made in health and education policy through the implantation of 'austerity' programmes (Blyth, 2013), options and opportunities are not only available, but a necessity.

6. Transforming the Public

Andy Hargreaves and Dennis Shirley located and described one such trajectory as the Global Fourth Way (2012). They were concerned about the privatization of the public sphere.

> The idea of public education for the common good is being replaced by the insistence that anyone can provide public education, even at a profit, so long as it improves tested outcomes for individual students (p. ix).

The decline in the reputation and public profile of teachers and teaching is only one consequence of such a movement. But their Fourth Way recognized the stages and state of education in the last sixty years.

> First Way - 1960s – Professional freedom of educators in the classroom but no way to disseminate best practice
>
> Second Way – 1980s – Introduction of standards and the market, but quickly standards turned into standardization
>
> Third Way – 1990s – Teachers learn from each other through lateral networks, but were limited by data-driven testing practices that restricted the parameters of professional conversation
>
> Fourth Way – 2020s – Enables complex understandings of high achievement while recognizing and managing economic decline, technological change, political instability and climate change (Hargreaves and Shirley, 2012, p. 1).

Such modelling demonstrates that the relationship between innovation and improvement is not cleanly and concisely constituted. Innovation is as much about removal – dead media - as invention. Why Apple was successful is that the company simplified the iPod interface to facilitate an intuitive relationship between music and the user. A series of musical platforms were removed to invent a new way of listening to and buying music. But technology and technological change must not be configured as neutral or banal. Nicco Mele in *The End of Big* (2013) showed that the last thirty years have mistakenly celebrated technology while undermining our institutions. The de-professionalization of knowledge through a searchable internet is clearly observed in education and health. Mele (2013) starkly presented the reality for universities.

> Cramming a thousand students into a lecture hall twice a week to receive the distilled knowledge of a tenured professor hardly makes any sense when these lectures can be recorded and distributed digitally. The ability to publish anything at any time to any audience at virtually no cost has led to an explosion of educational and research-based resources online, radically democratizing the creation, consumption, and dissemination of knowledge (p. 187).

With high quality online sources freely available from YouTube, what is the point of a lecture? This is not a rhetorical question. It is an urgent one. Our academics must be international experts in their field, teaching the innovative edge of knowledge derived from their research, but also be outstanding communicators in digital and analogue environments. In reality, what is happening is undergraduate education is being outsourced to casual staff who are teaching a curriculum handed to them from the previous year, including PowerPoint slides. If the tenured professors are offering a lecturing event where new knowledge is carefully crafted and presented, then students attend. Education is about community and connection as much as excellence and achievement. The reason MOOCs failed – and why most people who commence a MOOC course do not finish – is because the content may be available, but the arc of motivation, modelling, mentoring and achievement is absent.

The wider, deeper and more difficult question is what happens to 'the public good' in such futures? Henry Giroux (2014) has located what he terms "the culture of cruelty" (p. 60) and "the rise of civic illiteracy" (p. 80) in contemporary life. Both these cultural forces unravel the civil discourse required for considered and respectful conversations about the future of health, particularly the preventative medicine suite, and lifelong learning. Instead, the prevalence of pseudo-science, often encircling the words 'wellbeing' and 'lifestyle,' has created what William Davies has described as *The Happiness Industry*.

The emerging social tsunamis of depression, anxiety, disengagement, disappointment and despair have been described by Davies (2015) as "increasingly problematic for policy-makers and managers, becoming accounted for economically" (p. 9). The impact of 24/7 working practices and always-on digital devices is creating a population split between the over-employed and the under-employed.

The Disruptive Dozen, determined by the McKinsey Institute, list the dozen disruptive technologies that will transform industries. Some involve health and education. Most involve addressing peak oil.

Next Generation Genomics

Advanced materials

Energy storage

Advanced robotics

Self-driving vehicles

3D printing

Mobile internet

Internet of Things

Cloud-enabled technology

Automation of knowledge work (VanderMey, 2015).

Such digital disruption is a moment of challenge and a moment of reflection. It asks that workers and policy makers consider the errors of the past, the challenges in the present and the opportunities in the future. But the outcome must be sustainable and predictable. Disruption cannot be the engine of the health sector or education in the long term. Our goal is quality, dynamism, innovation and excellence. Tyler Cowen, in 2013, wrote the book *Average is Over: Powering America Beyond the Age of Great Stagnation*. He argued that we are managing a dual track economy. One economy deploys automation to increase the standard of living. Those unable to manage automation slide to the other economic track of reduced standards of living. It is here that leadership is a necessity. Leadership requires an understanding of digitization in context, not only managing the threats to organizational culture and people's lives but also shaping and building the opportunities between industries.

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