Future capability of education to embrace the knowledge economy

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Chapter 3: Future Capacity of Education to Embrace the Knowledge Economy

David Lynch and Rebecca Deagan

The 2000 epoch is known as the Knowledge Economy and there has been much written about its impact on society. Despite many calls for systems of education to change to better reflect this fundamentally different socio-economic circumstance, it appears the traditional classroom/ schooling regime prevails. With these points in mind this chapter examines the Knowledge Economy using a theoretical framework that makes explicit the implications for schools and teachers.

The Twenty-first Century is unfolding as a truly remarkable period in human history. Technological innovations explode onto the market at a daily rate only to be quickly replaced by a newer, faster and better version. Take the mobile phone for example. Outwardly the size has shrunk considerably over the past decade such that its only rival for size is the playing card. Inside the mobile phone its gadgetry illustrates the phenomenon of converged technologies. Whilst a mobile phone in name, its application far exceeds this rather erroneous name to include: a digital video camera, still camera, global positioning system, thermometer, calendar, compass, calculator, ‘e-pad’, web tool, diary, and the list goes on (Lynch, 2012; Lynch and Smith, 2007).

Similarly the motor vehicle, whilst still designed to take people from Point A to Point B, it has a central computer, which governs the vehicle such that driving is now supported by all manner of creature comforts and technologically assisted mechanics. It appears only a matter of time before the ‘driver’ is made redundant and replaced by an auto drive system. Diseases and ailments, once considered a death sentence, are now being efficiently dealt with by technologically advanced medicines and medical machinery (Houle, 2007; Dale, 2005; Christensen, et al, 2004; Moser, 2003).

Taken together these advancements represent a fundamental change in the structure of society, such that the way people live, socialise, and work today is a radical departure from a relatively recent era in which the church, the school, and the community were the mainstays of human knowledge, order, and understanding (Smith and Lynch, 2010; Clarke, 2001). Underpinning this fundamental change is a set of interwoven technological advancements that are created by human brain power and networked ideas and stimulated by a consumer market driven by a seemingly insatiable desire for ‘a better’, more convenient, social, and entertaining existence. In this new world the consumer seeks a capacity to ‘delegate’ the drudgery of everyday life to a gadget, be connected and up-to-date on a 24/7 basis, but only on topics and with people of interest, and have their next ‘want’ satisfied in new and unique ways and often with the expectations that it will be for free. While the consumer appears to be charting their own destiny in all this, using technology to assist, the opposite is probably closer to the truth (Houle, 2007; Clarke, 2001).
For teachers and schooling systems alike this new societal context is both an opportunity and a challenge. It’s an opportunity because these technological advancements offer alternatives to the ‘chalk and talk’ classroom learning paradigm and are generating new understandings about how people learn. A challenge also because this new society represents a fundamental disconnect from the world in which our aging teacher workforce were initially trained and a distinct contrast to the rigid structures of the school and their Nineteenth Century hallmarks (Smith and Lynch, 2010; Dale, 2005).

At a fundamental level this paper is about the ‘Knowledge Economy’. More specifically, the paper outlines the impact that the Knowledge Economy is having on the business of education. To achieve these inherent goals we begin with an examination of the Knowledge Economy phenomena. This provides an insight into the scope of change and the new capacities that this new socio-economic phenomenon generates. Using these insights as a discussion framework we examine what this might mean for a classroom and schooling paradigm that is more attuned to a Knowledge Economy. We turn first to an examination of the Knowledge Economy.

The Knowledge Economy

The ‘Knowledge Economy’ can be defined as an economy built on the wealth created from ‘know-how’. That is, the selling of technology based products for cash, exchanging them for something else of value or leveraging them to create added value. In comparison, ‘traditional economies’ rely predominantly on the sale of raw resources, commodities and primary processing to generate income and wealth. The key commodity in the Knowledge Economy is knowledge and its use to create new products and services is key (Dale, 2005; Moser, 2003; Doyle, Kurth & Kerre, 2000).

In a Knowledge Economy there is a rapid and increasing pace of technological innovation and shorter technology and product life cycles. There are new economic communities, whose prime function is the distribution and exchange of goods across national and continental borders where the market is increasingly technical and the consumer has access to various types of information and communication based technologies (Bauman, 2007; Moser, 2003; Clarke, 2001). Given these conditions, the prognosis is that a ‘worker’ in the ‘Knowledge Economy’ will have characteristics including: an ability to adapt to constant change and uncertainty; capacity to work in knowledge and service based economies and participate as constructive members in cohesive, yet changing, social communities (Smith and Lynch, 2010).

So as to better understand the Knowledge Economy phenomenon we draw upon Nowotny, Scott, and Gibbons (2001) who propose five presuppositions about the forces and conditions that affect both society and education and training and ultimately the whole premise of work. These five propositions provide insight into the scope and context of the Knowledge Economy and will be used to discuss the implications for systems of education. They are: the growth of uncertainty; the growth of new forms of economic rationality; the transformation of time into the ‘extended present’; flexible space; and increasing capacity for self-organization. Each is discussed in turn.
The Growth of Uncertainty

Rapid and recent developments in new products and service delivery structures and new information and communication technologies have contributed to far-reaching social changes. ‘Uncertainty’ is cited as being a characteristic of these developments: a state in which individuals find it impossible to attribute a reasonable definitive probability to the expected outcome of their choice. Instead, reality is perceived as a threatening series of possibilities inherent in economic life (Nowotny et al, 2001). Further, ‘risk’, once defined as an attempt to curtail uncertainty by assigning probabilities to expected outcomes, is now used to denote incalculability as an inherent feature of both knowledge production and social change. A willingness to take risks remains a key element of human activity and decision making, but it has become more difficult to determine who should take risks and for whom, to fathom the complexity of decisions made, and to attribute blame (Nowotny et al, 2001). In more simple terms, things no longer stay constant for very long. Change is characteristic of modern day life. Just when you think you’ve mastered or understood a phenomenon, the socio-economic landscape shifts and a state of uncertainty occurs. Concepts such as ‘life-long-learning’ and ‘throw-away and upgrade’ have their genesis in such a circumstance.

Interestingly, the emergence of new uncertainties, stimulated by a growing recognition of the potential of science and technology to bring forth new ideas, concepts, methods, and products, leads to new possibilities and in turn, to new uncertainties (Bauman, 2007; Nowotny et al, 2000). One such example is the role science is playing in understanding the processes of the brain (OECD, 2002). Researchers conclude that learning occurs through progressive construction of individual knowledge, not simply through information transfer (OECD, 2002). This has implications for schools and teachers, because it questions the relevance and effectiveness of ‘traditional methods’ and current means of instruction embracing ‘fill the empty vessel’ type pedagogies (Smith and Lynch, 2010).

The flip side of emancipation through knowledge is the risk posed by the emancipatory potential of knowledge. The increasing spread of knowledge in society and the concomitant growth in opportunities for action also generate social uncertainty. In this sense, science cannot provide society with ‘truths,’ only with more or less well-founded hypotheses and probabilities. Thus, far from being a source of secure knowledge and certainty, science is becoming increasingly viewed as problematic and uncertain. Take the conception debate. Does life begin when sperm and egg unite or when the ‘embryo’ develops the characteristics required for birth? These types of questions emerge because science adds new understandings and thus presents new ‘angles’ to explore a phenomenon. In a previous era ‘the church’ was called upon to adjudicate in such matters but today ‘science’ competes with various ‘others’ on the internet---websites, blogs, wikis, etc---such that knowing what to believe is fluid (Smith and Lynch, 2010; Bauman, 2007).

We can thus hypothesise that knowledge-based societies of the future will be characterised by a wide range of ‘imponderabilia’, unexpected reversals, and other surprises. The increasing fragility of knowledge societies will generate new kinds of moral questions, as well as questions as to who or what is responsible for our society’s oft cited political stagnation, causing us to
abandon that which constitutes the past and to turn to schools and teachers for new skills and career pathways (Queensland Government, 2008).

**The Growth of New Forms of Economic Rationality**

In a parallel evolution of science and society, a new type of economic rationality has emerged. This economic rationality acts as principal filter in selecting, constraining, and coping with an ever-increasing flow of new uncertainties resulting from developments that offer many and varied options. A major effect of this process is that industry and the research community relate to each other in a more dynamic way (Nowotny, Scott, & Gibbons, 2001). Consequently, the paths of basic research and future technological applications are converging, with 'end products' being assessed as profitable in the conventional sense and sidelined when returns are assessed as unlikely. That is, research now contends an economic rationality focussed towards profitability, irrespective of the outcome and the sectors that may or may not benefit from it.

On another plane, governments of all political persuasions, for example, view technological advancements as an opportunity to rethink and re-conceive their product and service delivery---think for example 'e-health' and conceptualise it as 'save money'---but battle and struggle with the 24/7 information delivery context it manifests and the capacity that the individual now has to voice a concern or argue a case with a national or global audience at will. Taken together the economics of society has now changed from linear logic and defined capacities to a networked conglomerate of possibilities, disrupted and redefined realities, and a new set of opportunities for the individual outside the context of an established business entity (Florida, 2006; Christensen et al, 2004).

**The Transformation of Time into the ‘Extended Present’**

This parameter is characterised by expectations and anticipations, where actions, choices and decisions are made in relation to the ‘here and now’. However, linking the present to the future (for the reasons detailed previously), becomes uncertain (Nowotny, Scott, & Gibbons, 2001). While people have always had 'expectations and anticipations’, the future is now experienced as an extended present in which correct decisions and actions can be taken in the expectation that the future can be shaped. Thus, organisations are concerned with ‘visioning’ and the identification of trends and mega-trends (cited in Nowotny, Scott and Gibbons, 2001; Nowotny, 1994). State education publications in Queensland, for example (such as ‘QSE2010’, Education Queensland, 2000 and Queensland Government, 2008), use data and extracted trends to define the future and in turn profess a new ‘vision’ for education and its schools: so demanding new roles and functions of its workforce.

The strategic plan that has subsequently emerged in Queensland state education, for example, envisions the future as something the organisation can and will achieve (Education Queensland, 2000). Various performance and accountability mechanisms are then implemented down the ‘chain of command’ (Education Queensland, 2000) as a process of ensuring the envisioned future is achieved. Continuing employment and promotion in this environment is
subject to an employee’s continued performance with respect to the performance and accountability mechanisms that have been set. The outcome for employees being increased ‘administrivia’ and a feeling of uncertainty within the organisation. This uncertainty is further compounded as organisations engage in downsizing, restructuring, automating and moving offshore in an attempt to remain profitable and viable (OECD, 2010; Houle, 2007; Seltzer and Bentley, 1999).

On another plane this proposition underpins how people generate and deal with their needs and wants. People are no longer prepared to wait for things. Gratifications are expected to occur immediately and if things are not forthcoming with speed then the interest wanes. This has the consequence of attention spans becoming short. Consequently, sound bites for example, become news headlines and movies include fast paced scenes and equally fast paced scripts. For systems of education the ‘whole of term’ study theme, such as ‘The Circus’ can become boring in a matter of minutes, especially when the World Wide Web can generates a new interest at a key stroke (see Smith and Lynch, 2010).

Flexible Space

Time and space are now negotiable commodities and can be customised to suit the user. The time to do things is becoming shorter and shorter--- think air travel and computerisation and labour saving devices such as robotics and automation. Associated with the shift in the time dimension, space itself is modified by information and communication technologies so that distance is reduced or even eliminated (Nowotny, Scott, and Gibbons, 2001). The creation of ‘virtual reality’ has made it possible to manipulate time and space according to the whims and imagination of users.

The processes that have compressed time and distance through advances in information communication technologies and travel, often referred to as ‘globalization’, have led to the intertwining of the world’s economic and cultural systems. Corporations and individuals alike now have instant access and impact on all sectors of the internet connected world, at least if they live in the West. When distance becomes compressed and bridged in this way, ‘flexible’ knowledge becomes ‘first hand’, accessible, and up-to-date to all those who are ‘connected’ in the Knowledge Economy (Nowotny, Scott, & Gibbons, 2001). The premise of 24/7 and ‘any where’ and ‘anytime’ becomes the expected norm. This has direct implications for schools. In contrast, schools trade on the transfer of knowledge from teacher to student using ‘pen and paper’ and the resources of a traditional ‘book’ library at speeds that characterise the industrial era (Bauman, 2007).

An Increasing Capacity for Self-Organisation

According to Nowotny, Scott, and Gibbons (2001), the self-organising property of the 2000 contemporary society is the capacity to define its boundaries and thus constitute everything beyond itself as ‘context’. Consequently, the more complex the system becomes, the more powerful is its potential for interacting with the environment. The capacity of individuals to ‘self
publish’ using all manner of e-publications or a blog or a website or a combination of all three is an example of such a capacity. A recent move in Western education systems to devolve various ‘central office’ responsibilities to schools, through programs such as ‘school self-management’ is another such example, as is the capacity of an individual to develop and operate a web based global business from home. These application examples were unimaginable ten or so years ago and their existence today is as a result of converged technologies encompassing: information, communications, finance, remote and automated systems and processes, and an innate human desire to improve one’s lot (Smith and Lynch, 2010; Florida, 2006).

The Implications for Systems of Education

As we have detailed, Nowotny et al (2001) have conveniently distilled such conditions and occurrences into a set of fundamentals. Taken together these fundamentals lie at the heart of a new socio-economic era in which knowledge and one’s capacity to use it in new and different ways is key (OECD, 2010; Queensland Government, 2008; Florida, 2006). In order to pursue the implications of the Knowledge Economy for schools and teachers we have developed Table 1. Table 1 distils Nowotny et al’s (2001) key propositions about the Knowledge Economy to reveal their characteristics and sample implications for systems of education.

<table>
<thead>
<tr>
<th>Phenomenon</th>
<th>Characteristics</th>
<th>Implications for Education Systems</th>
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<td></td>
<td>Life Long learning requirements</td>
<td>• New knowledge to be taught</td>
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<td></td>
<td>Throw-away and upgrade regimes</td>
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<td></td>
<td>Constant change circumstances</td>
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<td></td>
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<td>key worker capabilities</td>
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<td>The Growth of New Forms of Economic Rationality</td>
<td>New product life-cycles</td>
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<td>‘E’ product and service deliveries</td>
<td>• Change</td>
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<td></td>
<td>Different cost structuring arrangements</td>
<td>• Networks, networking, team</td>
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<td></td>
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<td>The Transformation of Time into the Extended</td>
<td>Improvements in transportation</td>
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<td>Present</td>
<td>New communication technologies Visioning processes/</td>
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<td>strategic planning</td>
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<td>Climate of ‘instant satisfaction’ of wants</td>
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<td>24/7 modes of operating and client service provision</td>
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<td>Individual mass communication capacities (blogs, websites, Face Book, Twitter)</td>
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<td>Various software and process management software programs</td>
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<td>that support individual effort without limited outside</td>
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<td>support</td>
<td>• Capacity for teachers to work</td>
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<td>• An increasing evidence base</td>
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Taken together, the data in Table 1 provide an account of a society that has changed fundamentally in a short period of time. Because the established systems of education prepare people for work in society and this society has changed, we argue the systems of education that
operate today --- schools and their teacher workforces--- are implicated to make corresponding changes: quickly and in a sustained fashion. These statements beg the question as to the scope of such required changes. Smith and Lynch (2010) provide some insight into such a question.

Smith and Lynch (2010) argue what’s required is the preparation of a different type of teaching graduate. A graduate who has a strong sense of social and educational vision, responsibility, and change to be a different kind of pedagogical practitioner from that of the teacher: what they call the ‘Learning Manager’, or more colloquially, the futures orientated teacher. To fulfil their vision for a futures orientated teacher, Smith and Lynch (2010) argue the learning manager requires a new set of capabilities that enable an individual or an organisation to implement instructional processes suitable for new curriculum requirements and to design the next generation that will replace them rather than simply modifying what is already there. Their underpinning learning management idea creates a set of ideas and a bundle of skills that transcend the schooling era that operated at the speed of pencil and paper and with the scope of a set textbook for learning. The premise of learning management comes to mean having the capability to replace and modify again and again, consistent with a set of values, ideas and procedures that give shape to the activity1.

More specifically, Smith and Lynch (2010) detail the learning manager as having a new and highly evidence based ‘knowledge base’ focused on pedagogical strategies that achieve learning outcomes and that inform and sustain the overall learning program intent. This commitment to achieving learning outcomes, which is driven by a learning management centric mindset that sees opportunity in change and technology, makes the learning management approach transgressive and disruptive in the conventional teaching and learning context of established systems of education. In more simple terms, they argue for a different type of teacher and a different system for preparing them. This type of change is at the core of what they say that the current and historically unchanged paradigm of education currently lacks: new teaching capabilities and new school capacities.

Summary and Conclusion

The Knowledge Economy has fundamentally changed the society that young people are growing up in. The workplace is in a constant state of change and commentators such as Smith and Lynch (2010) call for a radically different system of education to deal with the Knowledge Economy’s disruptive profile. Nowotny et al (2001) have theorised this new economy as having five key propositions for the future of society and together they are a significant contrast to the business that the current system of education is engaged in.

References


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*I Some of the text herein appears in previously published works.*