



Career Planning & Adult Development

# JOURNAL

---

Volume 31, Number 2

ISSN 0736-1920

Summer 2015

---

## ***OUR FUTURE: Projections of Work and Life***

***Helen Harkness, Guest Editor***

- **The Future**
  - **The End of Work as We Know It**
  - **Jobs and Careers on the Front Line of the Future**
  - **Silicon Valley and the New Rules of Work**
  - **Training Challenges Facing Education and Training and Career Development in the Future**
  - **Old people are people too, so let's act accordingly**
  - **Crisis of Human Capital in Aerospace: It's All About the STEM**
  - **College for All – Reality or Flawed Myth?**
  - **Our Jobs: The American Workforce and Economy in Crisis**
  - **The Future Has Arrived: The Future is Now the Present**
-



---

**OUR FUTURE: Projections of Work and Life**

**Looking Ahead with the Journal**, by **Steven E. Beasley**, Managing Editor .....4  
**Introduction to this Issue**, by **Helen Harkness, PhD**, Guest Editor .....5

**Chapter 1:** The Future, by **Leigh Ellen Key** .....8

**Chapter 2:** The End of Work as We Know It, by **Andy Hines** .....10

**Chapter 3:** Jobs and Careers on the Front Line of the Future, by **Gary Marx** .....20

**Chapter 4:** Silicon Valley and the New Rules of Work, by **Gary A. Bolles** .....28

**Chapter 5:** Training Challenges Facing Education and Training  
and Career Development in the Future, by **Timothy C. Mack** .....40

**Chapter 6:** Old people are people too, so let's act accordingly, by **Aubrey de Grey** ..... 47

**Chapter 7:** Crisis of Human Capital in Aerospace: It's All About the STEM  
by **Deborah Westphal** .....51

**Chapter 8:** College for All – Reality or Flawed Myth? by **Helen Harkness** .....54

**Chapter 9:** Our Jobs: The American Workforce and Economy in Crisis, by **Ed Gordon** .....65

**Chapter 10:** The Future Has Arrived: The Future is Now the Present, by **Helen Harkness** .....77

**Other Information**

**Guidelines for Authors** .....81

**Obtaining Back Issues of the Journal** .....83

**Joining the Career Planning Network** .....85

---

## Chapter 5

# CHALLENGES FACING EDUCATION, TRAINING and CAREER DEVELOPMENT in the FUTURE

by Timothy C. Mack

### Introduction

Following long term involvement in the global foresight community and from serving as the president of the World Future Society for a decade, I believe that the study of the future and the development of strategies for improving education, training and career development (both now and tomorrow) are interwoven in a number of ways. Both are very broad concepts, with interactive impacts across a range of sectors. When thinking about what is relevant to either, it is difficult not to respond with *what is not relevant?* Accordingly, I believe that the future of improving education, training and career development is the future of humanity, and how we all steer our course between potential opportunities and threats is a critical consideration for us all. As this is an opinion piece rather than a classical research paper, it is designed to stir up reader interest (hopefully to the point of open argument) and accordingly generate a robust dialogue about the issues I raise below. Let us begin.

Since thinking about what might impact career development and other related arenas in the future might yield little more than an extended discussion with few useful conclusions, I propose three specific issues to pursue throughout the course of this article.

**First**, we should examine which **trends** (social, economic, political) appear to most impact the future of education, training and career development, and ask *which are truly critical?*

**Second**, let us consider what effects the whirlwind of **new technologies** might have on how we learn, how we understand change and how we prepare for the possible worst and best to come.

**Third**, what **tools, skills, and techniques** may be available to enhance effectiveness and meaning in education, learning and training over the coming decades? One basic question here is to wonder whether the challenges facing the future of learning might not prove almost too challenging. In the 21st Century, while expanded technological capabilities have certainly led to higher volumes of connectivity, this at times seems to result in less relevant interactivity and knowledge sharing; especially when developing new education and training techniques.

### Drivers of Change

Technology continues to transform business, organizational and institutional learning, in ways that are not always for the better, in spite of Thomas Friedman's optimistic *The World is Flat*. The problem is that so much information, even in career development, can become a wall of *white noise*. This can produce a state of cultural dysfunction, one result of which is the rise of buzzwords and secret professional languages, while another is the tendency to tune out the content of constant communication.

---

One very critical consequence of this is a growing loss of dialog in some training settings. For example, after decades of being a *gold standard*, team building is now often seen by some as just *too much hard work*. This can be accompanied by an increasingly widespread social illusion of total self-reliance. A common expression of this is captured by the phrase, *Not always right but never, ever in doubt*. If external validation is perceived as unnecessary, then faulty assumptions are seldom invalidated.

At a cultural level, this is likely to lead to an increasing loss of mutual trust across society. When viewed in an educational context, it becomes a systemic problem, which may affect the underlying systems of communication critical to effective learning.

The challenge in addressing this troubling trend is how a trainer or career development professional can actually be heard against this din of white noise. One solution is to search for ways to enhance the dialogic nature of learning communications by enhancing the value, relevance and uniqueness of the information being offered. This can thereby increase the likelihood of that training module being heard, considered and acted upon.

### **Another Troubling Trend**

This second trend is a bit more long-term, and involves the continuing inability or lack of inclination of many governments, organizations, corporations, and NGOs to understand and respond to potential negative *environmental* change (a term used here in a much broader context than just relating to climate change) across a range of sectors. To put it in a more specific context, many groups actually adapt to change, not when they should, but only when they must (and then often too late).

A result of this dynamic is that many looming resource shortfalls that now face humanity will continue to grow; driven in significant part by the expanding consumption patterns of global prosperity at many levels. Ignoring these trends can only enhance their prevalence and impact. Accordingly, systemic solutions and public education strategies must be developed and implemented.

Let me provide a few specific examples: by 2025, over 36 countries will have major freshwater and agricultural land resource deficiencies (up from 20 countries today). These water problems include: pressure from growing populations, especially in the arena of food production; discarded pharmaceuticals and personal care products that inhibit or interfere with wastewater treatment processes; high costs of desalination technologies; etc. One solution path is to accelerate development of new technologies, such as greenways and other vegetation filtration systems for recycling grey water outputs.

By 2025, 3 billion people will be facing water scarcity (the figure stands at around 70 million people at present). In some areas of India and China, ground-water levels are falling by 1 to 3 meters per year. Rainfall declines of 15 per cent since the 1980s in East Africa will continue at least until 2050, according to United States Geological Service; very likely leading to a doubling of under-nourished people there by 2030.

---

### Third Troubling Trend

This leads us to the conviction that imagination and innovation are essential to both the identification of emerging problems and the crafting of *workable* solutions (and their lack could be highly detrimental). Use of the term *workable* here assumes that: resources exist for solution design and successful implementation, as well as the political will and ability to implement these solutions in a global context. These problems will not yield to a patchwork quilt of varied solutions, as has become evident from the ongoing hodgepodge of climate change solutions worldwide.

And as the future of urban areas is increasingly becoming the future of the globe, the need for imaginative innovation becomes more critical. The world urban population is likely to double by 2030 and there will be at least nine cities with populations over 20 million. As a result, by 2050 more than 70 per cent of the world's population will live in urban areas with a total global population of nine billion plus.

The central problem there is Unplanned Urbanization – development without consideration of economic, political, health and/or environmental consequences. One potential urban food solution that presents itself is downtown self-sustainable vertical farms; built into high-rise frames. Proposals such as Dubai's Food City have some appeal, with solar energy to power lights, pumps and conveyer belts, plus chicken and fish fed on plant byproducts. And by 2025, since 2.75 billion people will live within 60 miles of an ocean (a 30 per cent increase over the present) the broadly held expectation of between a one and a 14 meter rise in sea level by 2100 is certainly sobering, if not terrifying--bringing to mind the old foresight saw that *if you are not scared, you are not paying close enough attention*.

However, some counter-forces can be tactically utilized to offset those challenges, and these include a range of new technologies, public education on consumption practices and commitments to mutual cooperation. The relevance here in relation to education, training and career development is that any endeavor undertaken during periods of general resource shortfall will need to compete with a wide range of other demands.

### Fourth Troubling Trend

As well, it may turn out that humans are not the only decision-makers which will be involved in meeting these challenges and mitigating damages, which may further complicate their solutions. Without uncritically validating the singularity concept concerning the role of machines in human decision-making, this recognizes that novel factors are definitely in play. The *Digital Universe in 2020* report indicates that over 40 per cent of all communications anywhere will be machine-generated by 2020, (i.e., M2M or machine to machine). Of course, interpretation and response will be much faster than the typical human conversation, which could be as problematic as machine-driven stock and financial instrument trading in 2007 (which, if memory serves, did not turn out well).

Metcalf's Law states that communication networks increase in user value as they grow, especially where the capabilities of the whole are far beyond that of individual units. As well, these value increases can generate *unpredicted emergent properties*. One example classic is computer networks that come to exhibit abilities for which they were not originally designed. As a general

---

result, when system complexity increases, predictability declines. Where the number of machines who can effectively step in for human educators and trainers in a widening range of situations dramatically increases, the stances of those stakeholders involved will certainly be in flux.

### **Fifth Troubling Trend**

Many proposed solutions to the problems outlined above will appear viable in theory, but the most daunting task is how to build sufficient ongoing support, experience and resources into implementation to yield a successful result. Accordingly, identification of resources and expertise continue to be challenges to be faced and overcome, even after problem identification and solution suggestion have been developed; that is to say, making the solution work using resources at hand is never an easy task. This is not to say that reaching beyond one's grasp or *dreaming big* should not be encouraged, but only that a thorough understanding of whether resources needed for a viable solution and resources actually available will match up as intended. Then there is the political will, sufficiently broad stakeholder buy in, and essential community education needed to forestall inevitable knee-jerk change phobia.

### **Resources and Know-How**

This provides an entre to the question of how to address resource needs in what is often a 'diminishing resource' environment. Of course, we are all aware of the economic challenges that have faced the world over the past decade. But the water-related discussions in the paragraph above suggest just the iceberg's tip as far as how much expanding global consumption is out-racing global resource reserves and their levels of renewal. And it is not just consumables that are in question. Beyond energy, food, adequate transportation, waste management, and etc., there are more intangible issues such as sufficient educational resources and job creation to balance exploding populations in developing countries. One critical application of these resources is the enhancement of global education and training capability. There are plenty of ideas and not a few dynamic strategies already in play, such as the *One Child, One Laptop* program championed by MIT's Nicolas Negroponte; in part a response to the Thomas Friedman premise in *Flat Earth*. Part of the premise is that communications technology will broaden global participation to the level where it enables significant geographic shifts in knowledge firepower between developed and developing countries. In other words, within an ideal environment, the enabled soon become the enablers of others. But what we should also be on the lookout for are new ways to maximize the effectiveness of the learning experience. Strategies here might include:

- Better understanding of neuroscience and how we learn—expanding the range of delivery systems at conference—repetition and skill-building (maker fair model) activities.
- More clearly mapping how to effectively move from knowledge to learning, and thus avoid overloading an audience with information beyond the point where they can process and assimilate it. Trainees are often stressed by a massive overload of new information and tend to *zone out*, because their brains can't digest it all. One idea is to avoid 7 a.m. training sessions, but have more evening sessions and networking events at other times of day, when greater effectiveness is likely to be possible.
- Moving away from the traditional, there is some support for enrichment of training experiences by enhancing the engagement of all the senses (sight, hearing, taste, smell, and touch) and maximizing the use of more flexible, open-space organizing approaches.

- 
- Encouraging person-to-person collaboration and supporting creative gamification activities (interactive content that encourages engagement) and “hackathons,” such as problem-solving exercises and the building of new solutions for existing problems does a great deal to build engagement and training-team mindsets.

### **Standards for Future Education and Training**

Is effective education just persuasion or does it actually enable its recipients? One answer is that the latter is true when the education enhances self-teaching and student-directed learning, which often includes authentic dialog. Dialog is now technologically possible almost everywhere, and effective dialog can perform multiple tasks:

- Building potential channels of connectivity
- Building new attitudes (very often positive)
- Providing feedback, both positive and negative (only God never makes a mistake and it’s better to hear about it early – before it is unfixable)
- Special interest groups focusing on personal interests (foresight!)

Information consumes attention, thus making attention a critical leadership tool (and perhaps a potential currency). The rapid explosion of available information has resulted in a scarcity of attention. And the challenge is then allocating attention efficiently among the massive overabundance of information. One indicator guiding these allocation choices has proven to be relevancy, suggesting that a thorough understanding of the goals and mindset of the information receiver is not always achieved.

### **Relevance Measurement Tools**

One arena where message and dialogic relevance in training is being improved is in the arena of Attention Mechanics. In general, the research underway is a mix of psychology, epistemology, and system dynamics. When tied to career development, the process proceeds as follows: educational content enters the *field of attention* of an individual student or a community; then (ideally) the attention of that target audience is grabbed and held; and finally some level of understanding and possibly retention occurs. This Attention process is tied to the factors of Interest, Desire and Action (AIDA), but the training retention is most effective if the communication content is perceived to offer one or more of the following benefits: Immediacy (or relevance), Interpretation (or translation), Authenticity (or trust relationship), Accessibility (or ease of understanding), or Findability (of desired objects or valued activities). As a result, the content of the training program is then perceived as material essential to enhanced professional skills and professional success. To summarize, there is growing interest in more effective training tools and techniques. These types of tools will improve: Visualization [e.g., through Interactive Graphics or Animation] and/or Translation [defined as a successful restatement concepts in terms more comprehensible, relevant and important to the listener].

### **Using Foresight Tools in Education and Training**

There is a common distinction in the area of Education Foresight between discussions of the *future of education* and *education (and training) around the use of foresight tools*. Accordingly, I would like to conclude by taking a quick look at tactics and tools that might prove useful to the latter. I suggest that ethical consultants assist clients in building internal trend identification and analysis skills within their own organizations. Much has been written over the years on the use

---

of such classic foresight tools as scenarios, back casting, and Delphi studies, and I recommend the reader to that quite voluminous literature. At present, I will discuss a promising technique known as *weak signals*, that can be done with the help of a few colleagues. Let me begin this discussion with an overview. The promise of being able to create one's own virtual foresight capability is an intriguing one, perhaps by utilizing social media tools such as LinkedIn. Self-organizing Special Interest Groups that arise (for example) within the LinkedIn macro structure (such as those dedicated to the practice of foresight) can be especially useful. Listening is usually a passive activity; but it takes some serious digging to uncover the operational implications of a critical naysayer (external or internal) and how that affects one's own position. Up close and personal is usually one of the most effective ways to learn about others and vice versa.

Body Language Works! Mapping different experiences often requires collaboration versus teamwork, as the latter consists far too often of simply exercising good manners at the workplace. It often is more productive to avoid reliance on outside experts, as just as much or more relevant information is available in your own organization - from your own systems and people. As well, the relevant Knowledge Base does not walk out the door when a consulting contract ends. If the research and analysis process isn't unpleasantly difficult, you are probably not doing it right (or accomplishing much).

### **The Holy Grail of Foresight: Weak Signal Systems**

I use the term Holy Grail, because Weak Signals, while widely recognized as useful thing to have in an organizational tool kit, seldom reaches the stage of a mature and reliable foresight practice. MIT's Sloan Management Review has asserted that less than 20 per cent of global companies have an ability to spot, interpret and act on weak signals. One often illusive goal is locating new developments early enough. That is, uncovering developing trends neither too late nor too early, as too late does no one much good (like yesterday's news) and comes close to embracing conventional wisdom; while too soon can leave you too far ahead of other stakeholders and accordingly and out of connection with present 'real world' dynamics. Thus, building a functional regimen of preemptive and proprietary visioning involves a never-ending balancing act. For example, Weak Signal issues may be threats *or* opportunities, and the real challenge is knowing which are which, relatively early on. And weak signals are actually *suggestive* trends; so interpreting them takes significant time, focus and experience. Not all leadership teams have such luxuries; and those that do must use them wisely.

The reader might notice an energetic use of the phrase *education team*, because I strongly believe that the search for Weak Signals simply cannot yield useful results as the exercise of a single visionary analyst. It must be a team effort and ideally a community effort, involving coordinated work among concerned and relevant stakeholders to yield viable results over the longer term. Accordingly, the broader the search process and the greater the number of scanning participants, the higher are the chances of yielding relevant and useful results.

And the search for Weak Signals, properly done, can be very useful:

- To spot problems early and share them with allies;
- To extend the senses of the organization beyond organizational boundaries;
- To broaden stakeholder networks through distributed intelligence [one example is *Intelligence* which arose out of the US intelligence community after the shock of being blindsided on September 11, 2001].



---

Accordingly, the weak signal process involves looking for robust results (defined as offering the most application in the broadest number of settings). Thus, it is important to cross-utilize potential measures of interest, such as: social values; market dynamics; and attitude shifts, to triangulate the analysis. This means using cross-sector translation (to avoid buzzword blindness), and selective attention, which avoids the *zone out* that results from trying to see everything all at once, and the related failure to properly prioritize. The literature is full of what are called *black swans*, *wild cards* or other terms of endearment (because of the grief that results when they slip unnoticed). These low profile trends constitute events, which are highly unlikely but have a very high systemic impact that surprise knowledgeable stakeholders of all types.

### **Conclusion**

In summary, to be valuable to education and career learning professionals, foresight work should be focused and targeted, original and imaginative; provide economic, personal and cultural pay-offs, offer enrichment and learning, and include localization when relevant, to account for unique cultural and logistic details.

### **About the author**



**Timothy C. Mack** was president of the World Future Society from 2004 to 2014. From 2009-2014, he was Executive Editor of World Future Review; previously, he edited Futures Research Quarterly, and Future Survey. He has been an attorney and member of the New York and District of Columbia bars since the 1970s and has served as General Counsel for a number of profit and non-profit groups involved in trend analysis, social dynamics and public policy. After holding research positions at the John F. Kennedy School of Government at Harvard University and the US National Academy of Sciences, he joined the Budget Policy Task Force at the US General Accounting Office, which served as the analytical arm of the US Congress (now called the Government Accountability Office). He co-founded a Children's Law Institute while in law school and worked at the Institute for Human Policy. He was a Research Associate for the National Academy of Sciences' Committee on Child Development Research and Public Policy. He co-managed a Summer Institute for K-12 children. He has testified as an expert witness before the White House Conference on Small Business. He has delivered keynotes, seminars and consultations concerning trend analysis and foresight skills to over a hundred industry trade groups, government agencies and non-profits around the world. In August 2014, he started AAI Foresight, a consulting firm located in the Pacific Northwest.

Contact him as follows: **Web Site:**[www.aaiforesight.com](http://www.aaiforesight.com)