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Viewpoints & Discussion:

Research Skills for the Future: Research Workforce Under the Spotlight

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Note. This article is a response to a *Viewpoint & Discussion* article published in this journal: Ulrich, W., & Dash, D. P. (2013). Research skills for the future: Summary and critique of a comparative study in eight countries. *Journal of Research Practice*, *9*(1), Article V1.

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1. Introduction

In this article, I take up the call for discussion and debate of the value and training needs of the future research workforce. Ulrich and Dash (2013) provide a provocative discussion starter with their analysis of a recently published research report: *Skills and Competencies Needed in the Research Field: Objectives 2020*. Clearly, the aim of their article is to instigate a much needed debate about research context, processes, and outcomes, problematising the status quo. As an active educational researcher, research student supervisor, and member of the human ethics review committee, I have been grappling with the vexed issues of researcher identity, research competencies, and research practices for a while now. Hence, I gladly take up Ulrich and Dash's offer to contribute to the much needed conversation about the conduct of current research and the preparation of future researchers. I commence my response article by offering some comments on Ulrich and Dash's observations, echoing their concerns related to the methodological merits of the APEC/Deloitte (2010) report. In an acknowledgement of the substantial challenge of producing meaningful and high quality research, but more importantly, wrestling with the notion of who is or is not a researcher, I further explore the need for more conceptual clarity. Given the complexity of the issues under the spotlight, I will

organise my article as follows: (a) comments concerning Ulrich and Dash's (2013) viewpoint article, (b) comments concerning the APEC/Deloitte (2010) report, and (c) comments concerning the building of a twentyfirst-century research workforce.

2. The Viewpoint Article Under the Spotlight

While the authors of this first Viewpoints & Discussion article cite and critique the English language version of the report authored by L'Association Pour l'Emploi des Cadres (APEC) and Deloitte Consulting, they start with a disclaimer, noting that no "systematic and scholarly account of the topic is intended" (Ulrich & Dash, 2013, p. 1). Rather, their objective seems to be to provoke debate pertaining to the challenge of preparing researchers for the future, identifying problems, and maybe even pointing to unsatisfactory practices, misleading results, or missing data. It is noteworthy that the authors commence their review with the following explanation:

> The following account is based not only on the English translations of the two reports but also on the French originals and the German versions, as their writing tends to me more accurate than the English versions. (Ulrich & Dash, 2013, Section 1, "Introduction," last paragraph)

Interestingly, despite their review of various versions of the report, all the extracts provided in their article are from the English report, which makes it difficult to understand what exactly has been "lost in translation." The Organisation of Economic Co-operation and Development (OECD) has ample experience with testing and research material translation issues and is sensitive to possibilities of introducing inaccuracies, biases, and distortions, which translation processes can invite. Thus, the OECD has developed "stringent quality standards" (OECD, 2010, p. 3) for the translation of their Programme for International Student Assessment (PISA) testing materials. It would be interesting to test these quality standards and their effects. Weijters and colleagues (2013) have published some noteworthy study results investigating how response category label translations influence responses in multilingual research. Hence, not only would it be important to better understand the equivalence (or lack thereof) of the three language versions of the APEC/Deloitte (2010) report, but the issue of translation controversy in multilingual research, as identified by Ulrich and Dash, clearly demands our attention and warrants further investigation.

Another point of interest is the increasing global focus on researcher competence and research productivity, and their clearly identified intrinsic links to national prosperity (Chubb, 2013). Unsurprisingly then, the original report (APEC/Deloitte, 2010) commences with a brief justification of the study, pointing to the need to increase national productivity and international competitiveness in a global knowledge economy. The report explains that "research, and the issues of how to fuel it and how to resource it" are "unanimously" perceived as "make or break challenges" (APEC/Deloitte, 2010, p. 3) and that the success of contemporary research is dependent on a "specialist's ability to communicate clearly with other specialists in other disciplines" (APEC/Deloitte, 2010, p. 30). However, the notion of a *knowledge economy* remains undefined in the

APEC/Deloitte report and it comes as a bit of a surprise that this topic is not picked up either in Ulrich and Dash's viewpoint article. Given that the idea of developing a knowledge economy is central to the newly found importance ascribed to research work and the research workforce, I address this point in more detail below.

3. The APEC/Deloitte Report Under the Spotlight

The APEC/Deloitte (2010) research into the research workforce and its current and future skills and competency needs can be classified as a comparative study. The central aim of comparative international research, such as the APEC/Deloitte (2010) study, is to search for and document similarity and/or difference or variability.

The methodological shortcomings of the APEC/Deloitte (2010) report have been laid bare by Ulrich and Dash (2013). They note:

> Despite its design as an empirically based, comparative study, the report gives a scant account of its research approach. Even in the Full Report, the Section on "Methodology" (p. 4, fully cited in Extract #1) is barely half a page long and gives no accurate details about the study design, the way the interview partners were selected and interviewed, and the soundness of the data and the analytical procedures. . . . the report thus remains at the level of impressions and opinions rather than offering "hard" quantitative analysis. (Ulrich & Dash, 2013, Subsection 6.2.1, "Research Methodology")

I am in strong agreement with Ulrich and Dash's (2013) criticism that this is paradoxical, if not highly disturbing, and somewhat comical for a research report on research. Although, the report explains that a six-member expert committee "selected and led by APEC and Deloitte Consulting validated the study's main interim and final results" (APEC/Deloitte, 2010, p. 4), it is unclear how the findings were validated, as no detail is made available concerning research validity and/or reliability. In fact, the term *methodology* appears only six times in APEC/Deloitte's English version report: once on the contents page, followed by the section heading, within a quote from a Finnish research director, in two places in a table outlining key research competencies towards the end of the report, and a training program offered in Switzerland to young researchers and business executives.

No source is provided for "R&D spending as a percentage of GDP, and the number of researchers per capita" (APEC/Deloitte, 2010, p. 4)—indicators used for selecting (or not selecting) specific nations into the comparative study (for example, it is not clear why Australia was not included). The methodological problem of case selection in comparative international research is readily acknowledged within the literature (see Mills, van de Bunt, & de Bruijn, 2006).

Although not found under the methodology section of the report, it is explicitly noted that the study aims to explore "the vision and expectations of researchers and research managers with regards to skills and competencies" (APEC/Deloitte, 2010, p. 3). The

report outlines six questions pertaining to issues of research organisation, present and future research skills expectations in experienced and junior researchers, and plans, actions, or strategies that assist in attracting or retaining researchers (APEC/Deloitte, 2010, p. 3)

Maybe this report intends to be a trend setter, exemplifying "new ways of carrying out research" (APEC/Deloitte, 2010, p. 5), but it clearly does not live up to expectations concerning research rigour or validity. It largely fails to provide systematic answers to the research questions outlined and, more disturbingly, provides quantitative conclusions, such as relative frequencies of research skills in different countries, based on qualitative research design and interview findings. Further, the section on new ways of conducting research names, but does not explore, in any significant detail, issues of multidisciplinary research, ethics and ICT-related resources/tools. Rather inadequate "grand statements" are presented such as:

> For many of those interviewed, the ability to take into account the pertinence of research and its impact on society is now the most important of all the competencies. (APEC/Deloitte, 2010, p. 6)

Given the lack of methodological rigour and detailed analysis presented in the English language version of the report, I have to agree with the assessment made by Ulrich and Dash (2013) that this report cannot be viewed as more than a thought-provoking opinion piece. This is regrettable, because it would have been interesting to collect longitudinal data, repeating this study with one-year intervals or expanding the criteria to include different nations and/or stakeholders. However, given that the current report does not offer technical or methodological data in order to ensure verifiability, validity, and reliability, a future study will need to be redesigned and take great care to address the methodological shortcomings identified, especially if it seeks to have a cross-national impact and have its findings translated and published in different languages.

4. The Research Workforce Under the Spotlight

4.1. A Knowledge Economy Perspective

The intrinsic relationship between economic productivity, national prosperity, and research output is acknowledged in the original report (APEC/Deloitte, 2010), but it received only cursory attention. In fact, the phrase *knowledge economy* appears four times within the report (pages 3, 48, 82, and 112); even so, it seems rather by accident and not design. This notion and its interrelatedness with research work and the research workforce clearly warrants further discussion. The brief observations that follow may prepare the ground for in-depth and systematic analysis of the interdependency of these concepts in future issues of this journal.

The idea of developing a knowledge economy is central to the newly found importance ascribed to research work and the research workforce. Thus, the conceptual alignment concerning the idea of what constitutes high quality research, and how to promote and

conduct it in a global knowledge economy, demands a clear understanding of what a global knowledge economy is. In the name of conceptual clarity and the development of a common language (Simpson & Flynn, 2007), I will briefly explore the meaning of the phrase *knowledge economy* in some detail. Levy and colleagues (2011) observe that "the knowledge economy is often the subject of misunderstanding and mistrust—both from policy makers and the general public—but its importance is an inescapable economic reality" (p. 3). Contemporary knowledge economies provide different job opportunities and demand different skill sets from workers than previous economies from the industrial era. Knowledge economies generate knowledge-intensive work with high knowledge content, which "takes the form of expertise and/or experience, rather than being written down (or codified) in manuals, guides, lists and procedures" (Levy, Sissons, & Holloway, 2011, p. 9). The increasing flow of ideas, knowledge, and goods disregards national boundaries and hence, today's knowledge economies are global in nature and purpose. In other words, knowledge is increasingly seen as an important resource, which will make the amplified focus and attention of governments and industry on research and development all the less surprising. The message conveyed is clear: knowledge is becoming more important than other traditional assets, such as land and capital (Leydesdorff, 2011), because "knowledge is the most powerful engine of production" (Kefela, 2010, p. 162) in globalised knowledge economies of the present and future.

Research-related activities and research competencies fall under the category of knowledge work, which are referred to by Levy and colleagues (2011) as "intangible assets" and are not only seen as "the key commodity of the knowledge economy," but also "inherently hard to trade and value accurately" (p. 11). Most importantly, intangible assets, such as research workers and their work, are increasingly recognised as a central ingredient assuring national productivity growth, and an unmistakable driver of innovation. Hence, the strong link between knowledge-based economies of the twentyfirst century, and research workers, and their work, is indisputable. This increasingly close relationship will, so I argue, need to be better understood by policy makers, business leaders, and researchers alike.

4.2. Researcher Identity

The critical review of published studies has a long tradition, particularly in medical research. Clearly, critiquing study designs and investigating research design flaws can be very educative. Not only does it help build research capacity, it also contributes to building researcher identity. The APEC/Deloitte report notes that the success of contemporary research depends on a "specialist's ability to communicate clearly with other specialists in other disciplines" (APEC/Deloitte, 2010, p. 30). However, no further explanation or definition is provided concerning the ideas of what a researcher or research specialist is, and what constitutes research work. This conceptual confusion can also be observed in other research reports. Most interestingly, a recent consultation paper published by the Australian Government provides a definitional construct of Australian research workers. The report's authors note that researchers are "individuals actively engaged in research activities in Australia, or individuals with HDR qualifications (doctorate or masters by research)," noting that the categorisation should not be viewed

as being exclusive, because "not all HDR-qualified individuals are employed in a research capacity and not all researchers are HDR-qualified" (Commonwealth of Australia, 2010). The point of research qualification, or the lack thereof, within the current Australian research workforce, is made explicit in the Access Economics (2010) report on Australia's future research workforce. The authors note that "those employed as an active researcher do not necessarily hold a research qualification" (Access Economics, 2010, p. 12), which is also echoed by Bill Scales, Chancellor of Swinburne University of Technology and president of the Business/Higher Education Round Table, in a keynote address as recently as April 2013, when he noted that: "In a very practical sense, what we are seeing in our better performing organisations is that employees today are also researchers in some form" (Scales, 2013, p. 10).

The sole purpose of a definition is the provision of "a statement of the exact meaning of a word" (Oxford Dictionaries, 2013). The all-inclusiveness or lack in substance of the above definitions or explanations makes clear how difficult it is to capture the essence of the meaning of a *researcher*, the *research workforce*, or *research competencies*. Given these conceptual ambiguities, it is, so it seems to me, exceptionally hard for early-career researchers to develop a researcher identity.

4.3. Challenges of Building Research Competence

Similar to the goals outlined in the APEC/Deloitte (2010) report, Australia has identified the challenge of building and strengthening its research workforce, commissioning various major reviews and publishing a number of reports and consultation papers. In 2008, the Australian Government published the *Review of the National Innovation System* (Commonwealth of Australia, 2008a), also known as the Cutler Review and the *Review of Australian Higher Education* (Commonwealth of Australia, 2008b), also known as the Bradley Review, which pointed to some weaknesses within this sector. What followed was a flurry of activity to better understand the present state of affairs in Australia and develop strategies to strengthen Australia's research workforce (Access Economics, 2010; Allen Consulting Group, 2010; Commonwealth of Australia, 2008a, 2008b, 2009, 2010, 2011). The multitude of reviews, consultations, round-table workshops, and reports make apparent the central importance of the issue. But, more importantly, the burgeoning report landscape reveals, on the one hand, rising expectations of Australia's research workforce and, on the other, the great disparity of ideas of what research is, who should conduct it, what competencies are required, how it should be conducted, and who deserves the title of a *researcher*. Mark Dodgson (2008) was commissioned by the Australian Government to conduct a comprehensive content analysis of the Cutler Review. In his report, he states:

> There is little common purpose between the various elements of Australia's national innovation system or mutual understanding of how it is configured and how connections within it are enabled . . . [I]t is a disconnected system where there are few bridges between its major players. (Dodgson, 2008, p. 1)

In response to these events, the Australian Government has, in 2011, under the leadership of the then Prime Minister, Julia Gillard, embarked on a mapping exercise with the aim of matching research and productivity capabilities with innovation goals. The report entitled *Research Skills for an Innovative Future* provides yet another "vision for Australia's research workforce 2020." It outlines seven aspirations:

(1) Australian firms have access to the research skills and experience that will enable them to move up the value-chain and be globally competitive.

(2) Australia's public sector research organisations have sufficient research skills base to support their diverse roles.

(3) Australia's higher degree by research (HDR) graduates have the skills and attributes to both engage in world-class research and make productive contributions in a wide spectrum of professional roles.

(4) Australian universities, as the major providers of research training in Australia, have sufficient numbers of research qualified staff to develop the next generation of researchers.

(5) Australian research students, researchers, and research support staff are provided with clear and equitable pathways for career progression and supported to meet individual career needs and objectives.

(6) Australian research employers have in place the communication channels and linkages which promote the effective diffusion of knowledge (both codified and tacit) across the economy.

(7) Australia effectively draws on and harnesses the potential contributions of all research qualified individuals and facilitates participation in and engagement with the research workforce.

How did the report's authors arrive at these principles? Senator Kim Carr, the then Minister for Innovation, Industry, Science and Research, notes that mapping Australia's research needs to 2020 and identifying specific factors that "make for high quality research training" was a collaborative effort between the research and business community (Commonwealth of Australia, 2011, p. 5). Given earlier reports of Australia's disconnected system of research and innovation, the lack of transparency within the report about who the collaborators were that represented government, higher education institutions, and business to arrive at the seven principles to guide Australia's research and innovation future, illustrates that some of the criticism levelled at the APEC/Deloitte (2010) report will need to be repeated for the recent Australian Government report (Commonwealth of Australia, 2011). Based on undefined research, the report outlines some key challenges for Australia, most notably the scattered nature of the research workforce, the obscurity of research work and research competencies, the weak links between research activities commissioned and conducted by various government

departments, universities and business, and the aging research workforce. Specifically, the report notes that "an increasingly aggressive international competition" for researchers and research skills is one of the more pressing challenges that Australia faces, and the identified "emerging weakness in domestic supply channels" is predicted to put "a significant constraint on Australia's capacity" to meet economic productivity targets (Commonwealth of Australia, 2011, pp. xi-15). Other contributing factors, which compound the growing challenges faced by Australia to meet demands for highly skilled and knowledgeable researchers identified in the report are, the global financial crisis (GFC) and school students' declining engagement in demanding curriculum subjects, such as mathematics and science. Despite the numerous challenges identified, the report also acknowledges that Australia "enjoys a positive reputation globally as a world-class research destination for researchers and research students" (Commonwealth of Australia, 2011, p. xi). Moreover, in a quest to overcome the identified challenges, the report outlines 18 priority research policy areas as a road map for action over the coming years, which can be summarised as follows:

(a) Establishment of new processes and research standards, and the removal of barriers for individuals returning to the research workforce following a career break

(b) Establishment of benchmarks for quality research training and possibilities for introducing metrics for measuring excellence in applied research and innovation

(c) Strengthening oversight arrangements for national data collection practices in relation to Australia's research workforce

(d) Flexibility in providing financial incentives to attract high quality students, expansion of research training provisions for international students and developing new models of research training and family-friendly research workplaces

(e) Implementation of an Indigenous research workforce plan

(f) Financial support for inter-sectoral and international mobility

It is clear that this is a very ambitious plan. However, given the recent change of government in Australia, following the September 2013 federal elections, the new post-election research priorities and policies of the new Conservative-led Australian Government are as yet unknown.

5. Conclusion

Embracing Ulrich and Dash's (2013) call for discussion and debate, I provided a three-tiered response to the first Viewpoint article in this journal. I argued that there is a need for more explicit discussion of the shortcomings of the three language versions of the APEC/Deloitte (2010) report, but more importantly, I noted that the issue of translation controversy in multilingual research demands more attention and scrutiny. Moreover, I provided my support to Ulrich and Dash's (2013) observations concerning the

methodological flaws of the APEC/Deloitte (2010) report, noting that it is almost comical that research on research and the research workforce could be accused of being poorly designed. Finally, looking through an Australian lens, I identified challenges of building a strong twentyfirst-century research workforce, notably the lack of conceptual clarity of what constitutes research and who can be classed as a researcher. Most importantly, it seems that in broad terms there is global agreement on two key fronts: the urgency and the uncertainty of how to drive and measure research, and what strategies to employ to enhance business, government, and university collaboration in the support of the present and future research workforce. Scales (2013, p. 4) aptly noted: "As you will clearly appreciate, understanding the value of research collaboration . . . and knowing that business will gain from a greater relationship with the research community is one thing, making it happen is another." (p. 4)

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