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Keynote address

How can a 'teaching and research' academic scientist survive in the current economic climate?

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Abstract: Universities were conceived as places of scholarly learning and research, catering to an elite few with the ability and the inclination to pursue an academic lifestyle. In the post Dawkins era, the pressures of economic rationalism and of commercialisation of research, an apparent goal of near-universal higher education, and a need for increasingly competitive and complex team based research in the sciences have eroded the independence and the performance capacity of the traditional "teaching and research" academic. The default outcome will be that universities will become devalued as institutes of higher learning in the sciences, and will house within their walls quasi-independent research institutes staffed by researchers, who will occasionally teach to an increasingly didactic curriculum designed to maximise university income at the expense of quality learning. This will to the ultimate detriment of all. My paper will examine some alternative ways forward which retain the needed public accountability and allow satisfying, less stressful career paths for productive and enthusiastic scientists.

What's wrong with the job of the academic with an interest in biomedical research, and how can we fix it?

I was asked to make this a provocative talk, and scientists by their nature are conservative. However, I've nothing to lose, so I'll tell it like I feel it. Self-evidently these comments are my own and do not represent the views of my centre or University.

Academics should be setting their own agenda

It is of course dangerous to ask any academic to comment on how universities should work, and particularly on what their own job should look like - "Inmates running the jail" is the expression that comes to mind. However, someone has to propose what we are, as academics with a focus on biomedical research at Australian universities, trying to achieve in the 21st century. I believe the relevant academic staff should do the proposing. To some extent, of course, the golden rule applies: the government, who has the gold, makes the rules. However, the gold they have is our gold, and there is an increasing tendency these days to devolve responsibility for professional and academic matters from the experts to the bureaucrats. This is as true in the medical profession, where I've watched the consequences over my career with some despondency, as in education, where we're observing the effects of extensive social manipulation of university structure and purpose in the 1980s and 1990s, with some good outcomes and some less good. Of course, external intervention in University affairs does give us an excuse, when we don't like what's going on, as we can always blame "them". However, to do this would simply be a further example of the externalisation of blame that seems to dominate society these days - if I dive off a beach and break my neck, then that must be someone's fault - never mine. So let's accept that we should continue to take, as academics, a large part of the responsibility for the future of our universities and of their academic activities.

What should we be doing as academic staff with a focus on biomedical research?

If we wish to take control of the nature of our jobs, we need to consider what we're trying to achieve, and whether there's currently a problem with achieving it. If there is a problem, we should define the problem, the threats, and the opportunities that we have to face.

For the purposes of this discussion, I assert that academics [and here I draw no distinction as to seniority, or as to discipline, or even as to the basis of their funding] have four components to their job:

AIM 1: creation of new knowledge, i.e. research

AIM 2: its use for the good of humankind, i.e. application

AIM 3: fostering the next generation of critical thinkers, i.e. mentoring

AIM 4: imparting knowledge as part of a general tertiary education, i.e. training

For the purpose of this discussion I assume that academics wish to end up with jobs achieving some or all of these aims and that are satisfying, feasible, and appropriately rewarded. I also assume that the university collectively wishes to see the totality of these aims professionally achieved.

As an aside to the definition, I note that while university training has become rather focussed on providing professional career orientated knowledge and training, I don't subscribe to the belief that an academic education should have a sole purpose in fitting someone for a specific career: rather the university's responsibility should be to impart the critical thinking skills as well as core knowledge. In doing so they train the student to gather and interpret further core knowledge as it becomes available. Only this mix of training will enable the person so trained to enter continuing professional education well equipped. So I see aim 3 and 4 as rather distinct, and am increasingly concerned that the academic workload associated with Aim 4 has become so considerable in most disciplines that the mentoring (and indeed the practical training) has almost vanished.

Why is the government setting the agenda for universities?

In Australia, government provides the majority of funds that enable universities to function, although nowadays only half of university funding comes from government directly, largely to fulfil the training aim, and much of the funding for research and mentoring is distributed competitively. This contrasts us with universities in some countries, though it's hard to conclude from university performance that any one method of university funding is more effective for achievement of university goals than any other. For most academics, the major attraction of a university job is the opportunity to pursue research and student mentoring. However, in a business model driven society, whether capitalist or socialist, the community by and large expects that knowledge to be translated into policy or products. So there is a disconnect between the training being paid for by government, the translational research perceived as needed by society, and the research and mentoring that the service providers want to provide. There are recognised general solutions to the problem of staff and paymasters who expect different things of a job. However, given that quality academic staff are a rare and dying breed anyway, the most likely successful strategy is bribery – significant financial or other incentive to undertake the training and translational components of the job! This is not ideal and a more appropriate approach would be to find a mechanism to enable all

parties needs to be met by redesigning individual job descriptions to meet individual needs and expectations, of which more later.

What then are the challenges, set by government policy, that constrain the nature of an academic job focussed on biomedical research? Clearly, there are plenty.

- If 50% of youth is to be offered a tertiary education, which seems increasingly to be the case, a monotheistic tertiary education institution model with broad entry criteria – tertiary education for plumbers and theologians alike – is inconsistent with stretching the minds of the most able to the fullest.
- Imparting of knowledge to large numbers diverts academics from competitive research, as there are insufficient resources to properly staff “tertiary education for all” with academics with time to pursue research, if direct payment for education is deferred through the tax system.
- Control of opportunities for post tertiary mentoring by quota allocations of PhD student scholarships restricts opportunity for institutions to fund academics to provide mentoring, an integral part of research.
- If research is seen primarily as a mechanism for generating intellectual property for commercialisation and sale, as seems increasingly to be the case, then decisions about research priorities, and eventually about the worth of particular areas of human intellectual endeavour, will be coloured by the saleability of the product rather than by a serious desire to understand the physical world we inhabit and the intellectual world that we have created for ourselves, or to solve the social inequalities of the society we live in. Following this argument to a logical conclusion, generation of basic knowledge would go by the board, and with it, the opportunity for academics to pursue this aspect of their profession.
- If, in the global village, education is seen as a commodity to be sold to those that can pay, rather than a means to help solve the significant social injustices that follow from a significant maldistribution of wealth across the planet, then educational institutions will be marketed as a commodity, and compete for market space rather than striving for excellence. Academic effort will be directed to what will sell – professional courses in law, rather than discourse on how to solve the problems that beset us.
- If universities are to be run and judged as businesses, and academics are to be passed over as decision makers in favour of those with business acumen, then collaborative and democratic management of university life will be replaced by benevolent (or not so benevolent) dictatorships. There will be in consequence little regard paid to the concept of academic freedom of opinion, which allows intellectual honesty and moves research forward through debate and dissent.

These are of course just a few of the external constraints that have the potential to send academic jobs of the future down rather soulless tracks. Students will sue for lack of quality service, and research objectives will be set by consumer need for more appealing toothpaste, rather than by strategies to avoid tooth decay (or maybe they’re the same thing....!) Clearly, I’ve painted a black and white picture, where we are really looking at shades of grey, but it does no harm to learn from worst case scenarios, and plan accordingly.

What opportunities does government provide?

If these are the challenges, what are the opportunities provided by government policy? They too are many.

- Successive governments have, to date, affirmed that the academic research community is a better judge than government of the research that should be pursued in Australia, and have not made any serious effort to set a national research agenda beyond the definition of “broad principles” priority areas which are little used to determine research funding priorities. Thus, academics still have the opportunity to determine a responsible and appropriate approach to the choice of research activity we pursue.
- Universities are permitted and even encouraged to appoint research only staff who are relatively free to choose their own level of involvement in teaching and administration. Such freedom has its price, and the price in this case is high: a total lack of security of employment!
- The academic community is rightly seen as a “good performer” producing more than 3% of global research output, from 0.5% of the global population. We have not, however, been so good at reaping the commercial benefits of such research, for a number of reasons that need corrected.
- Academic advisors, when providing independent expert advice, are listened to. There has only been minimal attempt to censor expert opinion voiced by government funded researchers. We can speak to the people and their elected representatives as we feel inclined, to promote a cause, and without penalty.
- A level of research funding not too far from the OECD average is provided, at least in biomedical research, and we have just won significant promise of increased funding over the next few years. I note that the same cannot be said for government funded research in other areas of endeavour.

Is there really a problem, and if so what’s the solution?

Given the opportunities mentioned above to set the research agenda, to contribute to policymaking, and to fund our research, what then are we missing, that hinders us in our work, if we are to provide academics with satisfying jobs, the community with their needs and the government with their expectations. I believe that in a word the answer is “flexibility” – specifically flexibility of career structure.

Why don’t we have flexibility at present?

The current education system virtually mandates separation of the four roles of the academic described above.

If academics raise money to pay their salary to do research, they are judged, for practical purposes, only on research performance, and will therefore need to spend most time doing research, writing about research, writing for funding for research, and judging other people’s research, to remain competitive for funding. In consequence, however much the research only academic might wish to take part in teaching or in assisting in applying the products of research, they’re aware that time spent away from research diminishes their competitiveness in a very competitive world.

If conversely academics accept the “king’s shilling” and take a teaching and research job, they will be busy servicing a substantial teaching load, examining, and administering courses, and will rarely get near the lab. In due course, they are likely to become burnt out and uninspiring teachers.

Academics that choose the route of applied research, be it consulting or commercialisation, are cut off from the other two groups because they likely won't be in a university.

These are worst case generalisations but they seem to be truer than once they were, and not to be too far from the actuality of academic life, at least in the universities that I have experience of.

The Australian government dictates the size of the pot for the teaching, mentoring and research (a little overseas funding excepted), and makes the latter two funding sources competitive within and outwith universities. The size of any further pot for translation of knowledge to practice is partly government determined (clinical service, consulting) and partly determined by industry, and is almost a zero sum in Australia.

How can we engineer flexibility into the system?

We should be aiming for as a solution to the problem, in my opinion, using a “dial-a-pizza” approach, in which we let the individual academic choose the mix of their career, from the repertoire of research, consulting, mentoring and teaching. Its one I've adopted, and that I've encouraged within my own centre. Unfortunately, in Australia you are generally granted the option to follow this path only if you've been successful in research and are approaching the end of your career, or of course if you've actually retired and are not being paid any more! However it needn't be that way; mix and match can be provided universally, so long as certain basic criteria are met, and everyone knows the rules, and should at some level be facilitated by AWAs.

We need to ensure that there is a mechanism that caters for the needs and expectations of both the academic and the community.

The first requirement, to achieve this, is that those providing funding and those judging individual and university performance need to accept that a flexible approach to developing academic job descriptions on a person by person basis is an approach which better serves the need of the community. They then should support the flexible approach when evaluating all aspects of academic performance.

The second requirement is that it is critical that academics that are largely recruited to teach are nevertheless given the opportunity to participate in research and mentoring, at least intellectually, through discussion with research focussed academics. This should, within the biomedical sciences, be easier than it once was, as research has largely become a team effort, and there are many potential roles for academics within a team: Program leaders, initiators of new projects, mentors for students, coal face experimenters, writers of grants and of papers, providers of service (peer review etc), and assisters with research translation and commercialisation. Traditionally all of these have been expected of one person, and indeed performance was judged on the ability to keep all the balls in the air at once! Perhaps its time to change this paradigm and accept that while not all academic staff will initiate and steer research effort they all have something to contribute – of course teaching focussed academic staff themselves have to recognise that according to ability, chance, and stage of career their contribution to the research effort (while expected in at least one dimension to enable them to retain currency of knowledge for teaching) may not be constant.

To ensure that the aspirations of newly appointed academics can be tested for appropriateness, the opportunity for investigator discovery research should be provided to all “new” academics to whom a first university funded position is offered. This can be achieved through fixed term start up salary and infrastructure funding for up to 5 years. Of course, many will have pursued a career in research prior to this time outside a university environment, and may have already made decisions about the nature of their contribution to teaching, and to one or other aspect of a research program. However, for those who are truly “new” to university research, teaching responsibilities for the first 5 years should be minimal to enable maximal research opportunity, though not zero, as each new academic should develop teaching skills, and evaluate their interest in this aspect of an academic career. Thereafter, the mix between teaching and research related activity will be a matter for negotiation based on ability and personal desire. By and large, each new academic’s research activity would be integrated within a program. Appointments would be made to research programs rather than to teaching disciplines: past the first 5 years, the value of the research contribution would be judged by the program and the component of academic salary related to research would be determined accordingly.

The opportunity to assist with applying and/or commercialising discovery research, either through contract work or through secondment to industry, should be open to the academic to pursue as a means of testing this area of academic activity and also of supplementing income. Such opportunities usually emerge as a result of experience, and should be competitively awarded. They offer relatively higher financial rewards with less stability of employment.

Mentoring of research trainees should be encouraged and can be rewarded according to the number of students under supervision; a substantial component of the research formula allocation or of the student fees should be credited directly to the account of the academic to offset salary. Fees should be set so that the net available funds from an optimal maximum student load (say 6 students) provide a reasonable wage for a junior academic.

The teaching component of any position would be purchased from the research program by the university, as discussed further below.

At a university level, implementation of a flexible job description for academic staff requires organisation of the university round stable research programs rather than teaching disciplines – by and large the performance appraisal of the individual staff member will be within the context of the research program. Research programs will be larger and stronger and new programs will be initiated rarely, though the directions of a research program may shift with time. Each research program will offer teaching, and a program’s teaching contribution to the university will likely be to multiple areas. The university may not be able to offer teaching in all the traditional disciplines – but is that necessarily bad: logically, the teaching offering will be determined by what’s needed for generation of new knowledge, and will likely be of high quality. The university will buy teaching from the programs, and this purchase may comprise a core minimum in return for access to infrastructure plus extra according to teaching delivered above the minimum expectation. An averaging process, as is commonly used for distribution of university funding would be needed to ensure some stability for both parties.

Please note that I have made no intellectual evaluation of how or whether this might work in any discipline other than the biosciences – the argument is constructed round the natural need in biosciences research for multidisciplinary teams with a focus on international competitiveness and cutting edge technology.

If this flexible program for defining academic job descriptions sounds familiar, with the major novel component being the shift of focus from departments and schools to research programs, it's meant to! The benefits of the change are:

- each member of the academic staff can determine what they're good at and do it, and their focus can more easily shift over time
- the university can offer teaching programs reflecting current expertise.
- there is a greater focus on the international competitiveness of a research program rather than a research individual, and there is a clear place in the system for those who wish to contribute research as part of a team but are not the one who will be the program leader:

Of course there are downsides to all of this, not least that if an academic is not able or willing to be productive across any of the teaching or research domains of this academic "brave new world" they will need to find alternate employment. In effect this is currently the situation anyway, and this new approach would allow, I believe, broader opportunities for success not only for the academic but also for the collective effort of the university. .

Conclusion

My thesis is that we can, by and large, appoint academic staff in the biosciences to jobs that fit their preferred mix of work, and provide them with ongoing flexibility of job mix, provided that:

1. staff accept that performance appraisal in each area of their job will determine their ongoing ability to access that component of their salary and that their research effort cannot always be as team leader.
2. Universities accept that their strength and responsibility is primarily in generation of new knowledge, and that their activities should therefore be focussed round research programs rather than conventional teaching disciplines. Teaching will in consequence be more about quality than about breadth of coverage.

This approach is consistent with the goals of the current Research Quality Exercise. As far as university activity is concerned, its "back to the future" of a pre-Dawkins era with research intensive educational institutes distinct from those that are training focussed.

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