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editorial

Jack-of-all-trades

Statistics from the USA and Europe point to the same fact: many graduate students currently embarking on PhD programmes will not pursue careers in academic research. Once they have completed their *magnum opus*—rarely to be read after the thesis defence—they inevitably face the realities of the job market. It quickly becomes clear that for most of them the dream that lured them into the world of research is not attainable and a job remains elusive. For those that do succeed, the position that they find is not a permanent one, but rather a modestly paid temporary appointment with insecure support for research. They might continue as postdoctoral researchers, but this by no means guarantees them an independent position in a competitive research environment—even with a good CV and strong publications. Many PhD students and postgraduates therefore come to the conclusion, at some point during their training, that the best way to find a 'real' job, with a reasonable level of stress, is to leave academic research altogether and look elsewhere. This is often the case when children or other family duties have to be taken into account—and, in reality, these factors can help in the realistic consideration of one's situation and allow career changes to be made.

Given that most students end up in jobs that are not based on research skills, it raises the question of whether universities should continue to train PhD students in the 'classical' manner, or whether they should change and adapt their curricula to teach additional skills that are useful outside academia. Superficially, it no longer seems logical to focus PhD training solely on research skills, when these only benefit the minority who are able to put such skills to use. Some would argue that the majority of PhD students might be better served if they are taught non-research-specific skills, which are more in demand by other employers.

Some funding agencies have already come to this conclusion and are trying to mould the Doctor of Philosophy—the title reflects the ancient roots of the PhD—into a training scheme suitable for a diversity of job options, rather than just a rung of the academic career ladder based on research competence. The European Union's Marie Curie Fellowship scheme, for example, has quietly shifted the language and content of its PhD programmes to expand training beyond the acquisition of laboratory skills, to include a range of professional skills that are complementary to research. Similarly, The UK Biotechnology and Biological Sciences Research Council, with others, has broadened its grants to support the teaching of additional skills to scientists. The aim of this and other changes and proposals is to produce 'Jacks and Jackies of all trades'.

Yet there remains the serious question of whether universities and research institutes will be willing to accept this trend. I doubt that the primary investigators and senior scientists who train and support PhD students will see these changes as positive. Academic research is intimately linked to and depends on the commitment of young graduate students. In my view, it is not exploiting their commitment if we continue to train them with a focus on the traditional aspects of research. Some will of course thrive and embark on a successful career as scientists, and those who move into other areas will nevertheless have learned far more than just a range of research methods. In fact, the skills that they acquire—time-management, experimental design and the testing of hypotheses, the presentation of results, and the ability to critically review and discuss data—are all useful and applicable to a wide range of careers beyond research. Furthermore, if universities were to expand the PhD curriculum, it would inevitably mean diluting the teaching of core scientific skills. This could be to the detriment of research. It would also mean that those who are serious and committed to becoming research scientists would have to spend even more time acquiring the knowledge to become an independent investigator.

A curriculum that allocates a percentage of the examinations to research and the majority of scores to topics such as media communication, ethics, management and patent law might give the impression of aligning the primary training to the perceived needs of industry or other employers. But such a 'PhD' would be totally different to the classical PhD. I doubt that these new 'PhD' graduates would really have all the knowledge that employers demand because most of these are 'soft' skills that can be easily acquired at a later stage and in a different context.

Those students who are currently considering a PhD in the natural sciences, or who are in the middle of their research project, should not be too concerned that they will lose out in the job market because they seem to be ill-prepared for a non-academic career. Many generations of students have graduated with this 'deficit' and have nevertheless succeeded in following many diverse career paths. Instead, a more efficient strategy to support those who leave academia would be to offer something similar to a master degree or diploma in related professional skills, subsequent to a PhD. Such a scheme could even be tailored to the demands of different job markets. Providing this sort of additional training afterwards seems to be a preferable route for universities to explore, rather than diluting traditional research training.

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