



CONFERENCE PAPER

Veterinary education: how we got to where we are

T Heath

It's a great honour to contribute to the 80th anniversary celebrations of the Queensland School, and to do this at Science Week. The topic is broad, so I must be selective and I hope that, as this will almost certainly be my swansong, I'll be forgiven for focussing on aspects with which I was involved.

In this printed version I have retained the spoken word wherever possible, rather than try to convert it to the more formal style of a review.

It's easy to assume that the way we experience things is the way they have always been. I hope to show that such an assumption would be far from the mark as far as veterinary education is concerned.

This perspective has been formed from experiences in the three original veterinary schools – as a student at Sydney, teaching physiology to the first (three) classes at the re-established Melbourne School and then as the first full-time Dean and later anatomy professor at The University of Queensland (UQ). And from many surveys and two Masters degrees in education in an effort to understand what's been happening.¹⁻¹⁰

I'll start with the where, when and why of the veterinary schools themselves, then try to make some sense of the issues of gender, selection of students and the what and how of the teaching/learning process.

From the beginning

A century after the First Fleet, Melbourne veterinarian William Kendall established the 'Melbourne Veterinary College' associated with his practice and apparently funded entirely from fees, practice income and his personal resources.¹¹⁻¹⁶

Kendall provided a valuable service, but it was far from enough for the needs of the country. Australia needed a more formal system for preparing veterinarians who were able to investigate and control diseases of farm animals and to treat horses, which were the main means of transport and traction.⁹ Accordingly, his College was subsumed into The University of Melbourne in 1908. By then 61 veterinarians had been trained by the College.¹¹⁻¹⁶

In 1909, The University of Sydney also established a veterinary school. But, in contrast to the situation a century later, the demand for places was much lower than the need for veterinarians. Indeed, there was little demand for places in any faculty back then; few young people went to university. For example, despite The University of Sydney having been operating for nearly 60 years, there were

only 1342 students, one-third of whom were in medicine, enrolled when the veterinary school was established in 1909.¹¹⁻¹⁸

Furthermore, some of those interested in veterinary science were diverted into military service during the First World War, 1914–1918. As a result, the number of veterinary graduates from each faculty averaged only about 5 per year during the first 20 years.^{4,17}

In fact, both faculties were at the margins of viability largely because of a paucity of students and the Melbourne School went into abeyance in 1928. However, as Albiston¹⁶ explained, 'The Faculty of Veterinary Science [was] kept in being, mainly to enable Melbourne graduates to proceed to higher degrees in Veterinary Science, but also to advise the Professorial Board and the University Council on matters relating to veterinary education generally.'

Then, for more than a decade, which included the Great Depression as well as a progressive decline in the use of horses for transport and traction, Sydney was the only source of local veterinarians. But it produced an average of only 12 per year, including (a total of) two women.^{15,17}

By the mid-1930s, the government in Queensland had become concerned about difficulties in recruiting veterinarians for the state's animal industries and, as governments do, they set up a Committee of Inquiry. This recommended that UQ establish a Faculty of Veterinary Science. This recommendation was implemented, HR Seddon was recruited as Dean from his position as Chief Veterinary Officer in New South Wales and students were accepted from 1936.¹⁹

Unfortunately, in 1939 war again intervened and by 1942 only one student remained. He completed his course in Sydney and no more students were accepted until after the war ended in 1945. By then UQ had produced 12 veterinary graduates.¹⁹

By 1950, UQ had resumed educating veterinary graduates at the original site at Yeerongpilly, but a decade later the School shifted to the main campus at St Lucia.

The orientation of the course was made clear by Seddon in 1951,¹⁹ '...even greater bias than before has been given to the instruction in animal husbandry and preventive medicine, in order that the profession may carry to, and practice in, the animal industries that new knowledge than can assist greatly in the improvement of animal production and the safeguarding of the health of livestock.'

A subsequent relocation to the site of the former Queensland Agricultural College at Gatton, 90 km to the west, is another story and will be discussed later.

So by the middle of the 20th century, veterinary graduates were only coming from two universities in Australia (and New Zealand, which established its only veterinary school during the 1960s). The

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graduates, about 50 of them and almost all male, felt that they had been educated/trained primarily to serve the animal industries, including horses; companion animals were generally seen as almost an optional extra.

As an example: when I entered the workforce as a Government Veterinary Officer in Adelaide in 1960, there were only around 40 veterinarians in the state. About half worked for the government, servicing the animal industries, most of the rest were in mixed, mainly large animal practices in country towns, a couple worked with horses, and four – in one-person practices – provided for the small animals of Adelaide and its surroundings.

The next half century

By the late 1950s, veterinarians and stockowners in Victoria were becoming increasingly concerned at the difficulties in recruiting veterinarians and raised funds to persuade The University of Melbourne to re-open the School of Veterinary Science. Their efforts were successful and the first students were accepted in 1963.^{14,15,20}

Despite the entry of a third School, there was agreement that a fourth school was needed to satisfy the veterinary needs of Australia. The Australian University Commission, which then advised the federal government on university matters, commissioned a report from a Dr RN Farquhar. He concluded that, 'It appears impractical to expand the present schools to cater adequately and on a permanent basis for classes graduating more than 160 (Sydney 60, Queensland 60), Melbourne 40), therefore a fourth School of Veterinary Science is needed.'²¹

Farquhar argued that this school should be at The University of New England in Armidale, but this was not accepted and the fourth Australian Veterinary School was established at the new Murdoch University in Perth. The Premier, in opening the School in 1979, made clear his views on its role: 'The whole purpose of this school is to get the best trained surgeons onto farms doing wonderful things for the economy and for the farming industry of WA...I do not want to see vets caught up in the dog and cat syndrome.'¹⁵

So, by the end of the 20th century, Australia had four veterinary schools, each of which had been established in response to a perceived national need and without the host university playing a key role in moves to establish it. This situation was about to change.

Another century

By 2001 there were approximately 6400 veterinarians in Australia. This was twice what it had been 20 years earlier and reflected increases in the number of graduates from the veterinary schools, each of which had been forced to increase student numbers to meet financial and other pressures.²²

This had resulted in an increase in the number of graduates from an average of 220 in the 1980s to 320 in 2000.¹⁰ By this time, the number of veterinarians per million people (360) was higher than in either the USA or the UK (270 each).²²

In 2001, the Australian Government commissioned an enquiry by economist Peter Frawley, who examined the data and concluded (in 2003) that: 'The existing (four) Veterinary Schools are graduating sufficient students to meet current and immediate future needs and public funding of the establishment of a fifth Veterinary School in Australia is not warranted at this time.'²³

Despite the apparent acceptance of this recommendation, three new veterinary schools were established over the next decade: at Charles Sturt University (CSU), James Cook University and The University of Adelaide.

How could this happen? An editorial in the *Australian Veterinary Journal* in 2007 asked, 'Where have all the planners gone?' and concluded that, 'Who is doing what to ensure that Australia does not suffer significant negative effects from an oversupply of veterinarians?... Or has the horse bolted?'¹⁰

The horse had indeed bolted. The number of graduates entering the job market increased by 80% between 2001 and 2013,²⁴ and the number of veterinarians in Australia increased from 160 per year between 1981 and 2001, to 320 per year between 2001 and 2013.^{24,25}

In the 2007 editorial it was estimated that the number of Australian veterinarians would exceed 10,000 by 2016.¹⁰ In fact, data obtained directly from the Australian Veterinary Boards Council revealed that this was an underestimate: it had reached nearly 11,000 by mid-2015.

The Australian Veterinary Association, which had by then entered the fray, published a *Report on Projection Modelling for the Veterinary Workforce*. This concluded that: '...the national veterinary workforce will be in major oversupply between 2012 and 2025...Supply exceeds demand by over 50% in all cases for the national workforce.'²⁶

A detour: dogs, cats and veterinary graduates

The work done by veterinary graduates has changed a lot over the past half century. Until the 1960s many students were supported under government cadetships and were required to start work in a government department, working with production animals. These cadetship schemes then petered out and few graduates started their careers in government service, with the majority starting in private practice in urban or rural areas.

Although at least one-third were still entering rural mixed practice by the end of the 20th century, they were spending a disproportionate amount of time with small animals. Overall, this meant that by 2000, more than three-quarters of the time of the 'average' graduate was spent with small animals – an increase from less than one-quarter in 1950 (Figure 1).²⁷ This reflected the increasing dependence of veterinary practices generally on companion animals, which in 2015 was reported to be of the order of 80% nationally.^{27,28}

Unfortunately, the numbers of dogs and cats were not increasing at a similar rate. Although earlier predictions pointed to a progressive decline in their numbers, data published by Baguley in 2011 predicted that the number of dogs + cats would increase, but by only about 17% over the 20 years to 2016.^{10,29,30}

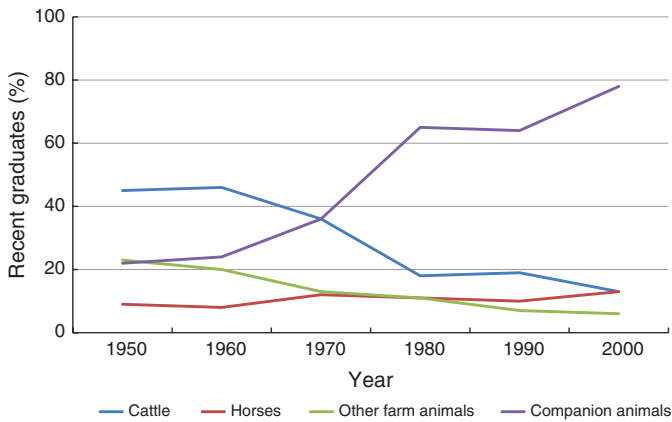


Figure 1. Changes in the work done by recent veterinary graduates, 1950–2000.

As the number of veterinarians more than doubled over that period, it must follow that the number of dogs + cats per veterinarian would have decreased by nearly half (Figure 2). Although the precision of these figures may be questioned, the message that they convey is incontrovertible, and worrying.^{10,29,30}

Why were the new schools established?

It seems that the forces that led to the establishment of these new schools came mainly from the universities themselves, rather than as a response to an independently-determined national need. The real reasons may never be known, but it cannot be coincidental that two of the newer schools (as well as the relocated UQ School) are on the sites of former agricultural colleges: the Wagga, Roseworthy and Queensland Agricultural Colleges.

Why is this relevant? For many decades agricultural colleges had provided valuable services involving research, extension and training for the agricultural industries. That role was severely affected in the late 1980s when the colleges were forced by the Commonwealth Government under Education Minister John Dawkins to relinquish their independent status and become part of universities.³¹

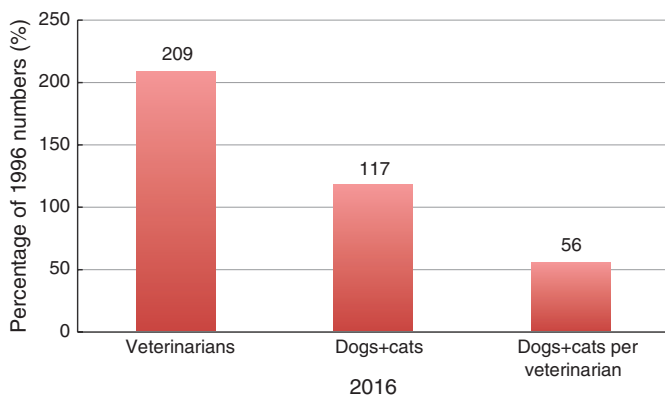


Figure 2. Change (%) in the number of veterinarians, dogs + cats and dogs + cats per veterinarian in 2016 compared with 1996.

This necessitated major changes in direction and focus, and caused difficulties for both the host universities and the former colleges. Furthermore, the college campuses suffered from a decreasing interest among potential students for agriculture-related courses and some of them apparently reached the limits of viability.

At UQ, for example, data obtained from university records reveal that the number of students at the Gatton campus decreased by more than 50% after amalgamation (Figure 3) and enrolments in many courses became vanishingly small.³² The transfer of 755 veterinary enrolments from St Lucia to the Gatton campus in 2010 halted the progressive decline in enrolments and provided continuing stability for that campus (Figure 3).

Fortunately, the university was able to obtain funds to provide adequate, high-quality facilities at Gatton, and thus head off problems with continuing accreditation. However, the university did have access to adequate and appropriate land much closer to the main campus.

As a close observer – and opponent – of the decisions that led to this shift from a large, comprehensive campus to a predominantly vegetable-growing area 90 km away, it is possible to assert that these decisions were driven by institutional self-interest: maintaining the viability of an ailing campus. The result is that many staff and students, tied for family or other reasons to Brisbane, now have to commute large distances – in some cases approaching a 200-km round trip.

It is tempting to wonder whether similar factors were behind the moves to establish the other new schools.

Another factor was involved in the establishment of the CSU School. This university had made representations to the Frawley Review of Rural Veterinary Services that they be given approval to establish a veterinary school at their Wagga campus. They argued that this would give preference to applicants with a rural background and that these graduates would return to rural areas. Frawley rejected this proposal on the grounds that the only objective evidence indicated that, although graduates with a rural background did initially move back to the bush, they left after a few years.²³

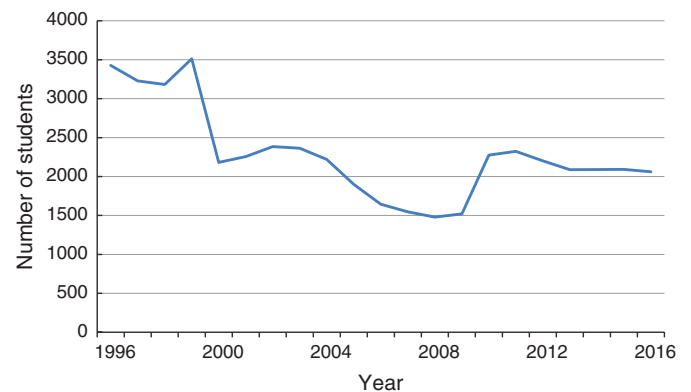


Figure 3. Number of students at UQ Gatton campus showing decline after amalgamation with UQ and the effect of relocating the Veterinary School (in 2010). UQ, The University of Queensland.

Frawley referred to a longitudinal study, conducted to try to establish whether giving preference in student selection to applicants from farms would help with the problems of maintaining a viable rural veterinary workforce. To this end, 154 (coincidentally 77 female and 77 male) students entering the UQ course in 1985 and 1986 were asked about their geographic and animal-related backgrounds and attitudes, and later they were asked details about the veterinary work they were doing 1, 5, 10 and 15 years after they graduated (Figure 4).³³⁻³⁶

I was told by the CSU Deputy Vice-Chancellor in charge of this mission that his university promoted a different interpretation to that of Frawley. They apparently argued that even though graduates from the bush did leave at similar rates to those from other backgrounds, more of those with a rural background remained in rural mixed practice and so helped to maintain a viable rural veterinary workforce. This argument apparently convinced the powers in Canberra and they gained approval to establish a veterinary school that would give preference to applicants with a strong rural background.^{37,38}

Gender balance

Although the first Australian woman veterinarian – Belle Bruce Reid – was registered in 1906, it was many decades before women represented more than a few percent of veterinary students.^{14,17}

From about 1970, however, the number of applicants to veterinary schools (and universities generally) increased to exceed their capacity and quotas were introduced.

Those applicants included significant numbers of young women and increasing numbers of them succeeded in gaining entry. As a result, the percentage of women veterinary students increased rapidly, reaching 50% within about 20 years – and continued to increase. Similar increases were occurring in other countries (Figure 5).³⁹

Some of the increase was associated with an increase in the number of young women studying at universities generally: their numbers increased from 20% to > 50% between 1960 and 1990 (Figure 5).³⁹ Although other factors must have been at play, their nature and relative importance remain unclear. One could be a lower level of motivation among boys to achieve the grades necessary to gain entry to

quotas, possibly associated with perceptions of unacceptably low financial rewards.

Another could be associated with attitudes towards animals and the profession. Evidence for this comes from a study in which equal numbers of male and female first-year veterinary students were given a list of 26 possible reasons for choosing veterinary science and it was found that ‘a love for animals’ was a significantly more important reason for females than males (P < 0.001).⁴⁰

This matched personal observations of students in the predominantly-male era: they/we choose veterinary science mainly because of practical, rather than emotional reasons: satisfaction from working with animals, then mainly horses and production animals. Emotional factors of the ‘love’ type were secondary at best.

It is tempting to wonder how much the emotional driver – a ‘love’ for animals’ – plays a differential role in encouraging girls at high school to make the effort to gain the grades needed to enter quotas. Perhaps some boys, less emotionally attracted to animals and perhaps conscious of potential income, wonder whether it’s worth the effort and select another career path, perhaps by default.

Selection of students

The demand for places in veterinary schools and in universities generally was low until well after the end of the Second World War. For example, in 1950 Australia had < 4000 university students per million people – less than one-twelfth of the present rate³⁹ – and the only requirement to gain a place was a pass in the ‘matriculation’, which was basically Grade 12 with some, or no, prerequisites.

However, although it was easy to gain a university place, it was not so easy to graduate, especially in minimum time. As an example: I believe that about 120 students entered first-year science in one of the Australian or New Zealand universities with the hope of moving to Sydney in 1956 to complete the veterinary course there. Most did not get that far: only 48 entered second year and 8 completed the BVSc in minimum time. They graduated with another 24 who had started earlier but repeated one or more years.

The number of university students increased sharply after 1960, from 5400 per million people to 22,400 in 20 years.³⁹ It soon became

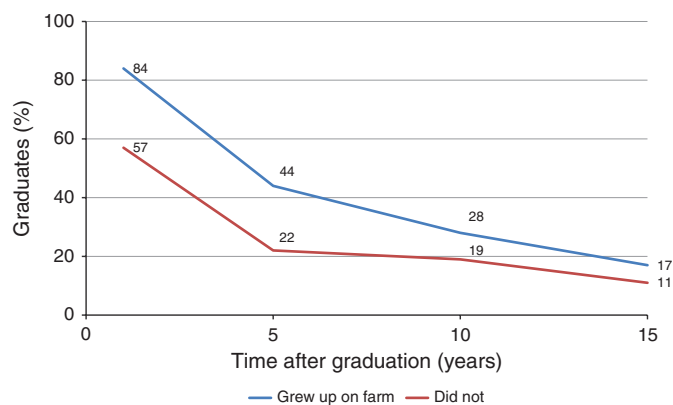


Figure 4. Effect of growing up on farms with animals on the numbers of graduates working in rural areas during the first 15 years after graduation.

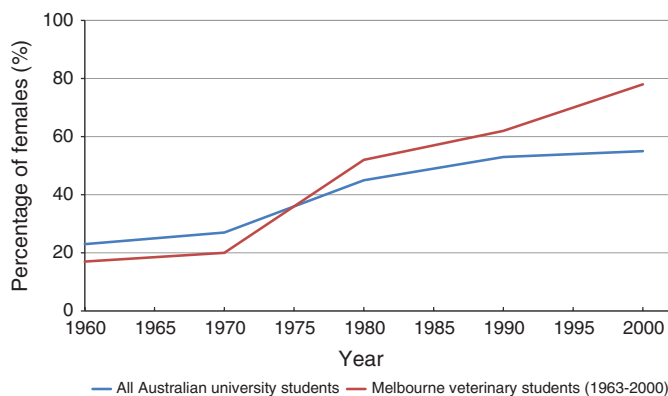


Figure 5. Comparison of females in all Australian universities and in the veterinary student cohort at the University of Melbourne (1963-2000; data provided by the then dean, Professor IW Caple).

clear that the numbers were becoming greater than the capacity of the universities and that it was necessary to impose quotas on entry.

The first veterinary school to impose a quota was the re-opening Melbourne School. Their first cohort of 50 was accepted to start in 1963. The failure rate was dramatically lower than had applied elsewhere in the absence of quotas and 38 students, including 6 women, graduated at the end of 1967.²⁰

Within a decade, the other Australian schools found it necessary to impose quotas. This led to a debate, which has not abated, about what the quotas are intended to do, apart from limiting numbers.¹ It would be simplistic to believe that quota places should just be rewards for previous academic performance, but more realistic to see application of the quotas as exercises in prediction.

But prediction of what? Certainly, given the costs involved, it seems reasonable to expect that those selected into the quota should be able to complete the course, preferably in minimum time.

But should this be all? Should students be selected, at least in part, on the likelihood that they will fill a particular niche in the veterinary workforce? If so, is there sufficient objective evidence that students selected on such a basis will fulfil that objective: fill that niche?

That was the rationale behind the longitudinal study mentioned before: to determine whether applicants from farm backgrounds would return to, and stay, in rural veterinary practice.^{33–36} That study did show that more graduates who grew up on farms did return to work in rural veterinary practice, but that they left at about the same rate as those from other backgrounds.

However, as mentioned earlier, the School at CSU was established on the basis of one interpretation of these data and a comprehensive system of selection was created in an effort to identify those most likely to continue to work in rural Australia.³⁷ Early data suggest that a majority of graduates selected on this basis will return to work in rural areas,³⁸ but it is not yet possible to ascertain how many will remain there over the longer term.

Teaching and learning

Traditionally, veterinary schools have promoted learning by students by a combination of (a) presenting the material, in lectures, notes, textbooks and more recently in electronic forms, (b) providing opportunities to apply that material in practical classes, including clinics, and (c) requiring students to engage with animals and those responsible for them in various forms of extramural work, notably 'seeing practice'.

However, there has not always been effective integration between and within these components. There has been a tendency for teachers to impose on their students the requirement to learn masses of detail, often concentrated in the areas of the teacher's interest, and too little effort made to (a) integrate it with related material or (b) encourage the use of it to solve relevant problems.⁹ This was highlighted by Bill Pritchard,⁴¹ former Dean at UC Davis, when commenting on the North American scene: 'Veterinary curricula have placed too much emphasis on the accumulation of information and too little on problem solving, critical thinking and the

development of desirable behaviours, professional attitudes and the acquisition of desirable psychomotor skills.'

There was also a tendency among some teachers to see their role as being restricted to overseeing the learning of veterinary lore and not to extend to facilitating the transition to the world of work. As a result, many graduates felt inadequate when faced with the routine tasks of practice immediately after graduation. The effects of these deficiencies were magnified for many by a lack of support from bosses and within the profession generally, and played a major part in the serious disillusionment felt by many recent graduates, especially during the last decades of the 20th century.^{42,43}

One set of skills that was seen to be deficient in many graduates related to their ability to interact with clients and other people.^{44,45}

Despite this being recognised as important by employers, the teachers did not see fit to include it in veterinary curricula until the 1980s.^{4,5} Some claimed that (a) these skills are innate and cannot be taught, (b) students would learn them anyway, apparently by 'osmosis' and (c) this was not sufficiently 'scientific' to be included in the veterinary curriculum.^{4,5} In reality, it is likely that these arguments hid a fear that the introduction of this material would be at the expense of their teaching time.

However, eventually it was possible to dilute the opposition and to introduce a sequence of segments at UQ to help students improve their interpersonal skills. Courses with this objective have now become commonplace and they include in the list of 'day one skills' developed by the Royal College of Veterinary Surgeons and which now form part of the requirements for accreditation of Veterinary Schools by the Australian Veterinary Boards Council.^{46–48}

This Council is now the arbiter of standards for veterinary education in Australia, taking over the role that had effectively been left with individual veterinary schools until late in the 20th century.

Attention to this was drawn by Frawley in his Review,²³ when he observed that: 'Course content is largely determined by accreditation requirements that lead to graduates possessing a broad veterinary education covering all species. However the Review is concerned about a declining emphasis on production animals in favour of companion animal health.'

This reflected an important shift in the orientation of veterinary courses. For much of the 20th century they were oriented largely towards horses and production animals, as this reflected the type of work being done by graduates.²⁷ However, it seems that the orientation has changed with the major changes in the proportion of companion animals in the work of graduates,²⁷ so making it more difficult to ensure that all graduates are competent with all species.

There have been many other major changes in the content of veterinary courses over the decades, most reflecting changes in the state of knowledge. The most pervasive changes in content have had their basis in the description of the structure of DNA by Watson and Crick in 1953.⁴⁹ It took a decade or more before the biological implications of this became clear, but then they progressively pervaded most aspects of biology, including our profession.

Tacit/implicit learning

Material that is learned more or less unconsciously, often without the 'teacher' being aware, has been often overlooked in considerations of veterinary education.

Much of this learning is in the non-cognitive realm and includes attitudes, observation, communication and other interpersonal skills. Our students learn so much from us as teachers by what we do and how we do it, what we say and how we say it, by our enthusiasm (or lack of it), as well as from the clarity, focus and purpose that we project, and the examples and illustrations that we use.²⁻⁵

Similar issues apply to 'work experience', which provides the opportunity to learn, often implicitly, how members of their future profession go about their business: how they interact with their clients and colleagues, confront and solve problems in the field and comport themselves as professional people, in addition to the more technical aspects of the profession.⁵⁰

This was of central importance when student numbers were low and most students 'seeing practice' would live in the home of the practitioner, spend most of the day (and often part of the night) in the car with them and so absorb a great deal about rural (as most was then) veterinary practice. This would have included some aspects of attitudes to and communication with clients and the day-to-day operation of a practice. As a result of this implicit learning, graduates did acquire some facility in these areas, even though they were not included as part of the curriculum.

It was clear from my experience, and that of my peers, that most of the practitioners involved willingly went to considerable effort for their students as they saw it as making a contribution to the future of their profession. Although that intensity of 'teaching/learning' for each student may no longer be possible, the potential importance of implicit learning in the practice setting remains high and must be considered carefully as plans are made to ensure that graduates are prepared adequately to move into the workplace.⁴⁸

The potential implications for tacit learning should be considered in any projected change in teaching methods. I will use an example from my field: veterinary anatomy. Traditionally, students have learned the relationships of structures to one another by dissecting them. But some so-called authorities have argued that these can be learned more efficiently from a computer image of someone else doing the dissection. What these advocates have overlooked is that while dissecting, students learn, unconsciously, much more than just the relationships. They develop skills in observing, in using instruments and in handling tissues – skills that they will need later as clinicians. If deprived of these opportunities, their clinical teachers may be dismayed at their lack of those skills, but not be aware of what could have been.

Similarly with lectures. A 'good' lecturer can have a major influence on the attitude towards and understanding of their subject by the passion, commitment and style with which they deliver the material.

Much of the value of this is lost if the student foregoes lecture attendance in favour of watching it, or some version of it, online. Furthermore, the act of taking notes, often the only record that most of us had, forces the student to engage with the material while summarising it. This forms the basis of a mental record – something that can

be developed further during private study. Even taking notes with a laptop has been shown to be less effective than hand-written notes, because this can be done with minimal intellectual engagement.⁹

It is, therefore, imperative that the potential implications for tacit learning be considered carefully in any proposal to replace a teacher with technology. That has not always happened.

The teachers

Although many changes have occurred in what veterinary students are required to learn and how this is presented to them, one thing has not changed: the value of a 'good teacher' – someone who is passionate, engaging and effective in their efforts to help and encourage students to learn information and skills in a way that can be used effectively in the future.

In any moves to replace teachers with technology, one maxim should be applied: do no harm. This involves making sure that the new situation will be at least as effective in promoting learning, including those things acquired by tacit learning. This has not always been the case.

Other issues

I freely admit that, because of lack of time and expertise, I have not commented adequately on some key issues, notably funding. This has been demonstrably inadequate in many/most Australian schools and continues to be a serious challenge for those responsible for the education of our veterinary students.

Acknowledgments

I am immensely grateful to my students, for they have encouraged and fostered my passion for doing what I can to help others to learn and given me great enjoyment and satisfaction over many decades.

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Preparation of this lecture involved no external funding or conflicts of interest.

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