The Challenges and Issues of Undergraduate Student Retention and Attainment in UK Veterinary Medical Education

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Abstract

Student retention and attainment has recently been identified as a key area of development in veterinary medical education enquiry. Woodfield’s (2014) research on retention and attainment across the UK disciplines yielded some unique information about the challenges and issues of students who study veterinary medicine and related subjects. This literature review aims to expand upon Woodfield’s findings and explain important issues about retention and attainment across veterinary medicine. Overall, the subject of retention and attainment in undergraduate veterinary medical education needs a great deal more empirical attention as there is a paucity of data on issues key to the veterinary profession, such as the retention and attainment of mature and widening access students, and the effects of students being placed at remote locations during their studies. Our findings also cover some unsurprising issues such as the profession is and continues to be dominated by women but it is principally lead by men, the under-representation of Black and Minority Ethnic (BME) students in veterinary medicine and the effects of content overload in the veterinary medical curriculum. Based on data gathered by Woodfield (2014) and our investigation of the scholarly and grey literatures, we offer an overview of gaps in current knowledge and recommendations for further research.

Key words: undergraduate, retention, attainment

Retention and attainment across veterinary medicine

In her report, Woodfield (2014) offers specific information on veterinary medical education1 (summarised in Table 1). These issues provided the impetus for this paper and form the basis of its structure. Table 2 summarises Woodfield’s (2014) findings on the profile of UK veterinary students.

Of the veterinary students described in Woodfield’s (2014) report, 390 students left without their intended veterinary degree. In the UK, veterinary programs are typically 5- or 6-year undergraduate degrees leading to a Level 7 qualification. Therefore, students failing to

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1 Includes (D1) Pre-clinical veterinary medicine, (D2) Clinical veterinary medicine and dentistry, (D3) Animal science and (D9) Others in veterinary sciences, agriculture and related subjects from the HEA sub-disciplinary subject areas under “Veterinary Medicine”
complete the whole program, but completing at least 3 years, are eligible to be awarded an alternative undergraduate degree (at Level 6 of the national qualifications framework), such as a BSc. Of the 390 students who left without their intended veterinary degree, 104 students were awarded an alternative degree. The reasons for this are outlined in Table 3.

**Curriculum, culture and custom in veterinary medicine**

In this section, we discuss and explain the main findings from Woodfield’s (2014) report on retention and attainment in veterinary medical education. We also explore additional issues related to curriculum, culture, and custom that are unique to veterinary medicine and were not investigated in Woodfield’s report, such as early career choice and coping with content overload.

**International feminisation of the profession**

Table 1 shows that women in veterinary medicine were 13-14% more likely to gain an upper-degree\(^2\) than men. Table 2 shows that the same proportion of male and female students (4%) left without receiving a degree, however, a much greater proportion of female students (67%) achieved upper degrees than male students (53%). While the retention and attainment of female students does not appear to be an immediate problem in veterinary medical education there are factors that dictate leadership and motivation becoming core components of the curriculum: the changing demographic of the profession, together with the known gender differences in attitudes towards leadership and management (Barsh and Yee 2011; Schweitzer et al. 2012). The imbalance between female and male achievement of an upper degree is addressed later in this article.

Woodfield’s (2014) finding that veterinary medicine is among the most female-dominant areas of UK higher education (HE) is no surprise. Woodfield’s (2014) figure of 79% female veterinary students is closely aligned with the Vet Futures (2014) figure of 77% female students. The feminisation of the profession is a Western phenomenon and an increasing trend. There is abundant evidence to support this – from the UK (Vet Futures 2014; RCVS 2014) and the US (AVMA 2015). In the UK, Vet Futures (2014) illustrates that while the veterinary profession is dominated by women (57%, \(n = 11,248\)) and while women’s leadership positions within the profession have improved over time, statistics from Vet Futures illustrate that women still fall short of leading and guiding the profession.

The consequence of this is a profession that is led by a male minority. Even though 40% of RCVS specialists are women, this is still a far cry from the 57% of women who make up the profession. As suggested by Henry and Jackson (2015), providing inspiration and motivation for women to take leadership roles in the profession must start during their undergraduate education, as evidenced by the different employment preferences of the genders, which has been documented after graduation in a report by the American Veterinary Medical Association (AVMA), and in ‘Veterinary Students’ by Armitage-Chan and Castro (unpublished data). The AVMA (2015) demonstrated the difference in employment preferences between men and women to show that women – particularly five years after graduation – want to work fewer hours per week than men. How leaders in the profession choose to manage these differences to ensure the best people are hired (regardless of their employment preferences) will be a key determinant of the profession’s sustainability.

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\(^2\) An upper-degree is typically defined as a First-class degree (average mark \(\geq 70\%\)) or a 2:1 degree (average mark 60-70%). All other degree classifications (i.e. 2:2, 3\(^{\text{rd}}\) and Fail) are considered ‘lower degrees’.
In terms of the curriculum, Taylor and Robinson (2009) argue that an increase in the number of female veterinary students requires a shift in focus to better balance female-centred ways of knowing (e.g. care and responsibility) and male-centred ways of knowing (e.g. justice and understanding rights and rules). This will ensure that the pedagogy and mentoring adopted are appropriate to the learning needs for the student cohort. Increasing focus on leadership and motivation during education will ensure that women are prepared and enthusiastic to lead a profession in which they dominate.

In terms of institutional role models, Robst et al. (1998) concluded that female teaching staff positively contribute to female student retention in STEM subjects, but it is essential that these staff actually interact with students on a formal and informal basis. However, this finding has since been challenged by authors such as Griffith (2010) and Price (2010) who present evidence that female students in STEM subjects are unlikely to persist with their tertiary studies if they are taught by women.

Since the profession is and continues to be dominated by women but is principally led by men, it is necessary to include leadership training in the curriculum with an emphasis on understanding the motivational preferences of women in the workplace. We suggest that the organisation’s structure is an important criteria for developing female students and encouraging them to persist with their tertiary education.

**Students from Black and Ethnic Minority backgrounds**

Table 2 shows an indisputable skew away from Black and Minority Ethnic (BME) students within UK veterinary medical education in that 87% of students are from a white background (among the highest of the disciplines in the HE sector). The proportion is similar for BME students leaving without a degree. While under-presentation is clearly an issue in UK veterinary medical education, the issue appears to be based in attainment rather than retention. Authors such as Grayson (1998), Hanner (2009) and Chang et al. (2014) have recognised the problem of BME under-representation in the veterinary medical field and beyond. However, it has only been Sanders and Rose-Adams (2014) who have most recently attempted to address the problem of attainment. While Sanders and Rose-Adams’ (2014) work reviews generic literature on BME student attainment, their recommendations to close the attainment gap between BME and White students are perfectly replicable across disciplines. These are summarised from Sanders and Rose-Adams (2014) as follows:

1. **BME staff in higher education** – while there is no mention of a statistically significant relationship between BME staff and BME student attainment, points are made about the under-representation of BME staff in HE faculties, the under-representation of BME staff in HE senior management and the poor retention of BME staff in HE faculties.

2. **Sense of belonging** – is defined by Goodenow as “Students’ sense of being accepted, valued, included, and encouraged by others (teacher and peers) in the academic classroom setting and of feeling oneself to be an important part of the life and activity of the class. More than simple perceived liking or warmth, it also involves support and respect for personal autonomy and for the student as an individual” (1993 p. 25). Sanders and Rose-Adams (2014) recommended that institutions develop strategies for developing a sense of belonging among their BME students; their ideas include developing role models and increasing numbers of BME students. From an analysis of effective approaches to student engagement and belonging, Thomas (2012a) suggests that student belonging is achieved through “supportive peer relations, meaningful interaction between staff and students, developing knowledge, confidence and identity
as successful HE learners and an HE experience relevant to students’ interests and future goals” (p. 7).

3. Language and academic support – academic literacy and linguistic competence were identified as critical factors. As such, institutions that add value to their educational service by offering support to students in literacy will go some way to addressing the attainment gap of BME students. Thomas (2012b) shows that personal tutors and peer mentoring are successful approaches for academic development and supporting. Interestingly, she also argues that mainstream support should be the default approach and targeted solutions are only offered in particular circumstances when general approach does not work.

4. The importance of student and tutor expectations – BME students tend to have lower expectations, resilience and self-agency of themselves compared to white students. Thomas (2012b) found that giving students the opportunity to share their concerns is an effective avenue for them to realise that their worries about studying are shared by others. Similarly, tutors also have a low expectation of BME students. As such, a culture of achievement needs to be embedded in curricula. Singh (2011) recognises the important role tutors have on improving expectations of British Medical Association (BMA) students and the suggests that “through mechanisms such as peer review, appraisal, personal development and module evaluation, [academic staff] should reflect on their own practices and examine if and how they may be consciously and unconsciously impacting student attainment” (p. 48).

To conclude, there is an under-representation of BME students in veterinary medicine. The issue is associated with attainment rather than retention but we also suggest is associated with recruitment as well. Fortunately, there are several strategies available to address this issue.

*Distance from home and student isolation*

As described in Table 1, veterinary students are more likely to withdraw from their course if their university is close to their previous place of residence. Perhaps because of the small number of institutions offering degrees in veterinary medicine (and therefore most students will need to travel greater than 30 miles from their previous home address in order to attend university), few students have the opportunity to choose to live close to home. Students’ options are further limited by the selection-driven rather than recruitment-driven admissions model in veterinary medicine: there are fewer places available than there are suitably qualified students, and therefore competition for places is fierce and universities are able to select students without having to recruit them. This means few students are in a position to select their institution; even if they would preferentially choose to live close to their parental home, this is unlikely to be an option, and students tend to accept any position they are offered.

There are limited data evaluating the effect of distance from home on retention and attainment. When examining general retention data, the effect of distance from home appears to be mixed. A positive effect on retention was associated with proximity to home (Williams and Luo 2010); though complicating factors also influence this relationship, such as the students’ urban or rural background (James 1999). However, these reports originated in the US and Australia, rather than the UK, and neither included veterinary students. Cost of living is increasingly influencing UK students’ decision-making regarding university location (Brown et al. 2009) and, therefore, it is reasonable to assume that future veterinary students may actively select the institution closest to home, and the finding that these students may be at
higher risk of withdrawal is therefore concerning. Of course, there may be various reasons for the observed finding, and closeness to home may be a proxy for other disadvantaging characteristics. This further emphasises the need for more detailed evaluation of this area.

Veterinary institutions are increasing their provision of distance-learning initiatives (Dheim 2007; Short 2002). While this offers students flexibility in their learning, the finding that the use of distance learning is associated with a lower student retention rate compared to traditional on-site learning is of concern (Simpson 2007). Concerns raised regarding online and distance learning in veterinary education include feelings of isolation from instructors and peers, lack of learning support and difficulty in teaching complex concepts (Ertmer and Nour 2007). Data regarding the uptake of distance-learning opportunities by veterinary students, and the impact this has on retention or attainment, is lacking. Pickles et al. (2011) investigated potential barriers to use of student support services in veterinary students. They demonstrated that distance to student support services is a factor in veterinary students seeking this support, thereby providing some discipline-specific evidence that those students electing to make greater use of distance learning opportunities rather than attending campus may be less likely to access learning support or other counselling services. Of additional particular concern in veterinary education is that student support services (whether learning support or student mental health services) may be centralised within the university and may therefore be some distance from the veterinary field station. The Royal Veterinary College has found (through discussions at examination boards) that higher than expected numbers of failing students make extensive use of distance learning opportunities rather than attending campus. Unfortunately this is currently based only on unpublished anecdotal evidence from small numbers of failing students, and further work is needed to explore this finding.

The effect of ‘distance from home’ on student retention and attainment has not been investigated in veterinary medicine. There are few veterinary schools, and admission is competitive, thus for most of the population students will not be able to access a university close to home. To date there is no evidence that distance is a factor influencing veterinary school choice in the UK. Increasing costs of living and of tuition may prompt future students to access the course from the parental home rather than attending campus, particularly if the parental home is sufficiently close to make occasional commuting feasible. This may place a greater barrier on students accessing learning and mental health support services, and may explain Woodfield’s (2014) finding that veterinary students whose institution is close to their prior address are more likely to withdraw. Finally, veterinary institutions are increasing their provision of distance-learning opportunities. If this discourages students from attending campus, there may be an impact on feelings of isolation, competency in complex curriculum areas, and access to learning support. Further data regarding this aspect of student behaviour is needed in order to establish how remote learning should be implemented in veterinary education, and whether this is a factor in retention and attainment.

‘Upper degree’ attainment: support for mature age and male students

Table 1 indicates that, in the review of student retention and attainment, neither gender (male student achievement) nor retention/attainment of mature students were deemed an area of concern for veterinary education. This finding is in agreement with the wider literature, with several veterinary-specific studies finding no effect of gender on overall course performance (Hudson et al. 2011; Van der Walt and Pickworth 2007; Muzyamba et al. 2012; Foster et al. 2010). UK veterinary courses tend not to award degree classes, therefore, ‘upper degree’ attainment is difficult to evaluate in this field. However, prior academic performance (achievement in A-level and GCSE subjects) appears to increase the likelihood of passing the
end of course final assessments in Veterinary Medicine (Muzyamba et al. 2012). Van der Walt and Pickworth (2007) investigated the effect on final exam performance of various personality traits in veterinary students; emotional stability, and being conscientious, socially adept and self-disciplined were associated with higher performance, and being imaginative, self-sufficient and anxious were associated with lower performance.

While there is no evidence within veterinary medicine that male or mature age students are at a disadvantage in final exam or overall course performance, degree attainment may be associated with school academic achievement and certain personality attributes, including propensity for collaborative working. Student support initiatives may therefore be usefully focused on students with lower school scores, and those demonstrating a preference for individual learning.

Career choice and its effect on retention and attainment

Woodfield’s (2014) results suggest that retention among veterinary students is among the best of the disciplines considered (i.e. 95% total continuing or successfully completing studies). For example, retention of mature students, male students and part-time students were not issues and veterinary medicine was one of the very few disciplines for which no exclusions were recorded. As a matter of interest, Figure 1 shows Woodfield’s (2014) reasons for students leaving veterinary medicine with no award or a lower award than intended. Attainment of an ‘upper degree’ for students of veterinary medicine was noted as matching the sector average (65%). In terms of retention however, Mikkonen and Ruohoniemi’s (2011) research found that “The common aim of becoming a veterinarian kept students committed even though they were not always interested in the content of their studies” (p. 302). While retention is an under-studied research area, we propose that there are some very powerful issues at work that are specific to the discipline of veterinary medicine – and disciplines associated with the understanding and care of animals – which explain the particularly good retention levels; these are detailed in individual sections below.

Early career choice

There is much evidence to suggest that the decision to become a veterinary surgeon is made at a very early age (Heath et al. 2006; Fraser et al. 2008). Tomlin et al. (2010a, p. 744) found that the statement “[It’s] something that I always wanted to do” was among the top three reasons for both women and men wanting to become veterinary surgeons. As such, unlike careers in disciplines such as engineering, accountancy and law where decisions are probably made much later in life, students who choose to study veterinary medicine possess deeply held inner beliefs about succeeding due to their ambitions being so long-term. Further to this, Serpell (2005) suggests that parents are more important than “experiences with animals” in shaping students’ career choices and attitudes towards veterinary medicine. The fear of disappointing one’s parents could give further credence to the notion of long-term inner motivations accounting for high retention levels.

While long-term ambitions and support from parents provide a very positive and unique explanation for student retention in veterinary medicine, Dale et al. (2010) highlight a cause for concern. These authors argue that veterinary students can fall short of recognising career opportunities beyond clinical veterinary medicine. Marshall (1981), uses the term ‘early emergers’ to describe young, multi-talented people who:
decide on a career preference at an early age, make commitments towards its pursuit long before leaving high school, and appear to follow this singular route throughout their total career development. (Marshall 1981, p. 305)

She warns of how early emergers can suppress personal development, creative learning and risk-taking behaviour. The long-term consequence being that this type of student uniquely needs to deal with identification problems, the fear of failure, the multi-talents and pressures that come from being able to competently turn their hand to a broad range of tasks, and various other challenges to career development. While Marshall (1981) recommends that trusted mentors can alleviate these problems, we argue that the role models of veterinary students (e.g. academic clinicians and practitioners leading extra-mural studies) are cast from the same mould. As such, we propose that student support opportunities, in terms of retention and attainment, come from a virtuous circle of identical beliefs and therefore intellectual isolation.

Vocational choice and the human–animal bond

Martin et al. (2003) propose that the human social bond, cited as “a mutual, affective, emotional attachment between two individuals that is relatively long lasting and survives temporary separation” (p. 67), is transferrable to relationships between human and animals and is a known reason for becoming a vet (Martin et al. 2003; Tomlin et al. 2010b), as is having previous experience with animals (Heath 2006; Serpell 2005; Tomlin et al. 2010a; Ilgen et al. 2003). Veterinary students who ultimately wish to work with production animals have less of an association with the human–animal bond than students who aspire to companion-animal care (Martin et al. 2003). However, growing up on a farm is a major contributing factor to the selection of a career with livestock (Tomlin et al. 2010a; Heath et al. 2006; Ilgen et al. 2003).

Reflecting on the work of Martin et al. (2003), the importance of the human–animal bond in career choice is evident in the prominence of UK vets caring exclusively for companion animals, or in a mixed practice.

While there is no evidence from the veterinary medical literature to suggest that this is the reason why students either stay at veterinary school or aim to achieve an ‘upper degree’, we conclude from evidence like that presented by Tomlin et al. (2010a), that the human–animal bond is certainly a complementary reason to life-long ambition in students staying at university and needs further investigation. Furthermore, Martin et al. (2003) suggest that the human–animal bond seems to decrease through students’ secondary school years and after their first year at veterinary school. Their research is inconclusive about why this occurs but the authors suggest that this may be due to (1) the science-based, non-clinical nature of the first years of veterinary curricula, (2) the students’ realisation of the difficult emotional issues they will encounter as vets (e.g. euthanasia and cases of abuse) and (3) the possibility that:

those pre-vet students interested in the [human–animal bond] self-select out of veterinary programs. Or, alternatively, is there some characteristic of students interested in the [human–animal bond] that interferes with their acceptance into veterinary programs? (Martin et al. 2003, p. 71)

These are three hypothesised, but untested, explanations for the human–animal bond decreasing with student maturity. Clearly, there is a need for further investigation of this matter.
Student resilience and motivation to learn

Mikkonen and Ruohoniemi (2011) discuss the fact that students are prepared to work particularly long hours to fulfil their aspiration to become veterinarians. These authors draw the conclusion that this is because the students are a particularly motivated demographic. However, there is substantial evidence of the particularly stressful nature of veterinary education (Reisbig 2012; Hafen 2013; Laakkonen and Nevgi 2014). This, coupled with Marshall’s (1981) list of the negative characteristics of ‘early emergers’ and her comments on their fear of failure, paints a fairly vulnerable picture of veterinary students. Mossop (2014) describes the highly specialised and ‘high stakes’ nature of the veterinary students’ assessment, whereby students are trained to meet the challenging expectations of the Royal College of Veterinary Surgeons. This involves gaining a high level of competence to diagnose and treat all animals while working independently and adhering to the rigorous standards of the profession. Despite these demands, the two previous sections have provided evidence for two unique reasons why vet students possess motivation and resilience for completing their education: (1) early career choice, and (2) the human–animal bond. Further explanation can be found in the literature on students’ motivation and resilience.

Mikkonen and Ruohoniemi (2011) found that the most successful veterinary students are particularly good at quickly adapting their learning styles to cope with curriculum variety. They are also effective at searching for new study practices in an effort to understand difficult concepts and then resume their study without delays suggesting yet another reason for good student retention. Walker et al. (2006, p. 251) define resilience as “the ability to recover rapidly from difficult situations as well as [having] the capacity to endure ongoing hardship in every conceivable way.” Even though all students in the health disciplines have to cope with hardships they have “a personal and cultural strategy for surviving and even transcending adversity … [due to] characteristics such as extroversion, openness, agreeableness, conscientiousness and coping levels [that] influence posttraumatic growth” (McAllister and McKinnon 2009, p. 375). Walker et al. (2006) and McAllister and McKinnon (2009) argue that resilience can be taught, so curricula can be designed to build resilience into those students who enter higher education and are lacking in this skill.

Authors such as Crosling et al. (2009), Walker et al. (2006) and McAllister and McKinnon (2009) suggest that the environment of small-group, student-lead teaching that is based upon reflection-on-practice (that is so characteristic of veterinary education) may explain student retention. Furthermore, an environment in which students have a clear vision of their future (McAllister and McKinnon, 2009) and enjoy close working relationships with people of critical roles in identity formation (Walker et al. 2006) will foster student resilience. Again, the hands-on nature of veterinary teaching (e.g. student rotations in-practice) and assessment (e.g. objective structured clinical/practical examinations) facilitates such an environment.

We conclude that high retention of veterinary students can be explained by their career choice being made from a very early age, the vocational–nature of the discipline and the human-animal bond that is unique to the profession. So despite the numerous hardships and challenges experienced by veterinary students, they have particularly high levels of motivation and resilience that helps them persist with their education. We found that resilience can be taught and the hands-on, small-group nature of UK veterinary curricula provides a solid foundation on which resilience can be built and developed. Furthermore, the clinical nature of veterinary curricula means that students receive mentorship from scholars with whom they can identify and fulfill roles that have relevance to their future.
International student issues

Woodfield (2014) states that 91% of veterinary medicine students are pre-HE domicile UK, with 2% from the EU and 7% from non-EU nations. This is largely representative of the situation at the UK’s largest veterinary medicine school: the Royal Veterinary College (RVC). Figure 2 shows the RVC’s student cohort for the past five academic years. As Woodfield (2014) suggests, the cohort is strongly over-represented by UK students (87%). Woodfield’s (2014) data shows that 9% of Veterinary Medicine students were pre-HE domiciled outside the UK but it does not specify the countries of origin (EU and non-EU data provided). Figure 2 shows that the RVC’s international student cohort is made up of students from North America with a further 4% of students coming from other non-EU countries.

The US Department of Education has accredited all seven universities offering undergraduate veterinary education in the UK, allowing their home students to be eligible for a student loan (FAFSA 2015). However, there are a lot of regulatory procedures to be tackled for students wishing to take part in the loans programme as the rules are framed, understandably, with US institutions in mind and often cause problems for UK students. The latest issue is that institutions foreign to the US must be accredited by a body that is in turn accredited by the Department of Education; the RCVS has had to recently undertake this process and approval is still pending. Strictly speaking, if approval is not granted then no UK department of veterinary medicine accredited to take US students can process loans anymore (i.e. RVC, Edinburgh and Glasgow). While officials have indicated that approval will be forthcoming, should UK veterinary schools lose students from the US due to the discontinuation of the loans programme, the result could be a substantial loss of diversity in the student population and a loss of revenue. Two per cent of Non-EU veterinary students left without their degree (n = 12), while 6% (n = 11) of EU students and 4% (n = 367) of UK veterinary medicine withdrew. It is acknowledged that retention and attainment of international students is not of great concern. However, changes in foreign education policy could jeopardise the small international profile of Veterinary Medicine students in the UK.

Learning strategies for coping with content overload

Students in veterinary medical programs are frequently reported to be at risk of content overload (Pelzer et al. 2014). “A proliferation of knowledge in all scientific fields and an increase in public expectations of the profession” (May 2008, p. 573) has resulted in enormous growth in the volume of information that could be delivered to the students, “just in case they may one day need to use it” (p. 577). Efforts to reduce course content are therefore discussed in the literature, including the incorporation of a tracking or elective system, whereby core content is reduced by moving some material out of the compulsory section of the curriculum, and allowing students to selectively take this material according to their species and ultimate career interests (Halliwell 2006). Students recognise the high course content and workload of the veterinary course, which results in stress and anxiety. Williams et al. (2005) reported that academic stressors were the more frequent causes of stress than any other source; 85% of students described the workload of the veterinary programme as a common source of stress, resulting in feelings of tiredness and fatigue (50% of students), unintentional weight change (20%), trouble sleeping (33%) and health concerns (33%). Even at the initial stages of the veterinary course, students report anxiety about the intensity of the programme, the amount of material they are expected to learn, and their own time management and study skills (Sutton 2007).

As reported in general for other subject areas, students frequently adopt surface learning strategies to cope with this content overload. Although the workload is ostensibly the same
for all students (if defined by the volume needed to learn), this is of course not the case if
different study abilities and prior knowledge are considered. Veterinary students with
previous university experience encounter less stress when faced with the veterinary course
workload (Laakkonen and Nevgi 2014). Ryan et al. (2004) identified that students with less
prior relevant knowledge, those who felt their prior knowledge was inadequate, and those
who were less able to extract important points from their reading, were more likely to
employ a surface approach to learning, with a resulting negative impact on their grades.
Interestingly, students who had to travel a long distance to class were also more likely to
adopt a surface approach; this is of particular interest for those students who elect to live
away from university accommodation (for example with parents), and students for whom
there is no on-site (or near-site) accommodation available, as previously discussed. This group
also identified that students who perceived the workload to be high were more likely to adopt
a surface approach to learning (learn by memorising content within boundaried sections of
the course). Veterinary students who have difficulty distinguishing key concepts from
supporting material, and those who perceive their study efforts do not lead to success were
more likely to perceive that they are overloaded (Mikkonen and Ruohoniemi 2011). In this
study, students who described themselves as slow or weak learners, and who were unable to
select essential concepts for study (and hence attempted to learn everything), took longer to
complete the course, and attained lower assessment grades. They reported that they had
found it necessary to learn the material by rote, and had not attempted to find different or
new ways to study. A fear of failure was also associated with a surface approach to learning,
with students concentrating on easy subject matter, avoiding difficult topics and finding it
difficult to work on areas they found less interesting (Laakkonen and Nevgi 2014).

The strategies employed by students who successfully manage high course content typically
involve earlier-obtained study skills. The reliance on students previously acquiring the study
skills necessary to succeed in the course is of concern because of the implication this has for
students who are not equipped with these skills. Gelberg and Gelberg (2005) highlight that
the volume of content veterinary students are expected to learn, and the pace at which they
are expected to do so, means time management problems and study skills deficits are not
necessarily detected during earlier education, and thus students may not be aware that they
need to seek this type of assistance. Furthermore, the high grades necessary for veterinary
school admission have led to some assuming that study skills support is not necessary for
these students (Ruohoniemi et al. 2010). Students who cope well with the course load have
better learning strategies and time management skills, are able to use computers and library
resources effectively, and are able to use a variety of approaches to learning (Mikkonen and
Ruohoniemi 2011; Ryan et al. 2004), have a better understanding of course assessments and
use knowledge of these to assess their own level of understanding (Ruohoniemi et al. 2010),
are able to select key areas in the course upon which to focus and prioritise their studies
(Mikkonen and Ruohoniemi 2011), and integrated different areas of their course during their
learning (Ryan et al. 2004).

Given the evidence for differing student abilities in managing an overloaded course content,
institutional interventions and teaching strategies that encourage deep learning have also been
investigated. Courses that encouraged reading around the subject (not simply by providing
this reading, but providing opportunity and motivation to support this) were more successful
in developing deep learning in their students (Chigerwe et al. 2011). When examining practical
sessions within the course, these could be used to drive deep approaches to learning course
content if students were able to use the practical environment as a means of understanding
the wider subject area, if the practical motivated the students to learn more about the subject
(e.g. it was related to a clinical scenario), and when students were encouraged to ask questions (Ryan et al. 2009).

The provision of ‘opt-in’ study support is frequently made available for students who are struggling academically, however, students may not approach support staff for fear of being seen as incompetent. Williams et al. (2005) reported that 86% of students only occasionally or never asked for help from academic staff, and 87% rarely or never used counselling provided by non-academics. An alternative approach is to employ teaching methods that provide this support through the curriculum; an example of such a strategy is a clinical case, group problem-solving exercise that was designed not only to develop clinical problem solving skills, but also to assist with collaborative learning strategies (Khosa et al. 2010).

From this investigation, we therefore suggest that teaching strategies encouraging deep learning approaches in the face of a high content load also include opportunities to engage in self-directed learning (e.g., selection of and reading reference material). Educators should also highlight where different program components integrate, and provide transparent assessments and frequent feedback so students can align their efforts with course and assessment outcomes.

Support strategies for ‘Gateway’/widening access programme students

The final issue relating to retention and attainment of veterinary students involves those from non-traditional academic backgrounds, typically those with lower-grade senior school qualifications, qualifications other than A-levels, and those for whom neither parent attended university. Veterinary medicine is under-represented as a degree choice for such students. Hoelscher et al. (2008) demonstrated that the likelihood of a student with vocational education and training entering veterinary science was 25 times lower than for a student with traditional academic qualifications. Widening access programme students are therefore likely to experience feelings of isolation when entering veterinary education. All of the UK veterinary schools have widening participation policies (Robinson 2007), however, only the Royal Veterinary College (RVC) provides its own access course (the University of Nottingham has a link with the Certificate in Health Science at Lincoln University, which serves this purpose). Some schools relax not only their academic entry criteria for widening access students, but also the requirements for pre-entry work experience (Robinson 2007).

Payne-Davis et al. (2008) described the widening participation access course (‘Gateway’) instituted at the RVC. Student support was deemed to be particularly important to this course, and therefore weekly academic and monthly pastoral tutorials were included in this access course, as well as regular interaction with the course director, and support provided in the event of failing in-course assessments. Although similar tutorial provision exists in other courses at this institution, this extent of tutorial support was higher than is typically provided. However, despite the provision of financial support in terms of a bursary, financial concerns were deemed by the authors to remain a threat to persistence on the veterinary medicine programme; some students (numbers not provided) also left the course because of feelings of isolation.

At the same institution, Muzyamba et al. (2012) provided an indication of the academic attainment of ‘Gateway’ students. Following entry to the five-year veterinary medicine course, students accessing via the access course had lower final year exam scores at the end of first and second year, but demonstrated no difference to other students in the end of third year exams. Data was not available for year four or five exam performance. Payne-Davis et al. (2008) also noted that some widening access students achieved at high levels, obtaining merit
and distinction-level grades. Comparative data between widening participation and traditional entry student attainment are not available.

There are no other reports of institutional initiatives developed specifically for widening access students or those entering from full-time work, within veterinary education. The educational literature frequently demonstrates the need for student academic and pastoral support in this area; Hafen et al. (2008) report a high incidence with signs of depression in first year veterinary students (one-third of students), and Pickles et al. (2012) report a perception that veterinary students have an increased need for counselling support compared to other students. Rather than assuming that widening access students are not supported, it is therefore more likely that this support is provided through initiatives established for veterinary students in general. However, due to the lack of literature in this area, it is not known to what extent such support is accessed, or whether the specific needs of widening access students (relating to feelings of isolation and lack of belonging due to differences with ‘traditional’ higher education students) are addressed. Since 98% of veterinary students in the UK are trained in pre-1992 higher education institutions, typically associated with high percentages of white, middle class students, the feelings of isolation and non-belonging are at risk of being particularly significant in the absence of intervention.

Although some institutions publish their policies for recruiting and supporting students from non-traditional backgrounds, it is difficult to make generalisations because of the scarcity of information published in this area. Retention and attainment information for students on the RVC widening access course is published in small quantities, but insufficient cohorts have run to course completion at this time. To add complexity to this issue, the higher education institutions offering veterinary medicine qualifications tend to be traditional, pre-1992 universities, where issues of isolation may be the most prevalent for non-traditional access students. It is therefore pertinent to remain aware of the potential for retention and attainment issues, and ensure institutions have appropriate steps in place to recognise students needing support, and ensure that the support that is provided incorporates the specific needs of this student population.

**Further challenges and issues for investigation**

There are several key themes that have emerged as discipline-specific to retention and attainment within UK veterinary medical education: coping with content overload, the long-held inner beliefs about a career in veterinary medicine and the informal support structures that are offered by members of faculty. The over-arching finding of this enquiry is that retention and attainment in veterinary medicine needs a lot more research attention with some specific gaps being immediately obvious.

The advent of educational technologies that facilitate learning outside the classroom has been advantageous in providing non-traditional methods of information delivery. However, more information is needed on the use of distance learning technologies by failing students. More precisely, whether distance-learning technologies are contributing to negative student behaviours and feelings of isolation due to their inherent nature of social disconnect. On a related matter, more information is needed on the uptake of distance learning opportunities of veterinary students in general as this has not been investigated.

Table 2 shows that students of non-white ethnicity categories made up 0-2% of total veterinary medicine students in 2010-11. It was also found that attainment and recruitment, rather than retention, is a problem among those few BME veterinary students. The literature
provided some clues about how this can be addressed (e.g. student support in terms of language and academic support) but discipline-specific research needs to be conducted on how the issue of BME attainment can be better managed in veterinary medical education.

Woodfield (2014) presented data to suggest that retention and attainment in veterinary medicine is generally not as much of an issue as in other disciplines. This paper aimed to explain the various dimensions that contribute to Woodfield’s finding. One area that emerged as particularly important and unique as a possible reason for the high retention rate in Veterinary Medicine is the human–animal bond. While there is evidence to imply this relationship, further empirical testing needs to be conducted to explore the relationship in more depth.

There is a great deal of precise knowledge still lacking about retention and attainment in undergraduate veterinary medical education, but this enquiry has gone some way to explaining and expanding upon Woodfield’s (2014) findings. This research has presented some gaps in the current knowledge and we have identified starting points for future research. We propose the following research questions for further enquiry:

- How can leadership be truly embedded as part of the core curriculum to develop female students?
- How can the few BME veterinary medical students be better supported in terms of their sense of belonging, language support, and academic support?
- What mechanisms could allow other disciplines to benefit from the resilience of veterinary students?
- What support initiatives could be usefully focused on students with lower school scores and those demonstrating a preference for individual learning rather than competency in collaborative learning skills?
- How can deep learning approaches be embedded into veterinary curricula and address content overload?
- What further data need to be collected and analysed to monitor the retention and attainment of non-traditional access students in veterinary medicine beyond the limited and incomplete data available for a single cohort of students from the RVC?
- What distance-learning opportunities exist in the veterinary curriculum and what are the rates of uptake? Does distance learning have a positive or negative effect on student retention and attainment?

Acknowledgements

We gratefully acknowledge the generous support of the Higher Education Academy in the UK for its input into this research.

References

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Hafen M, Reisbig A, White M...


Mossop L. Developing and Delivering Quality Items for High Stakes Assessments in the UK Veterinary Schools [Internet]. The Higher Education Academy. Available from:


Figure 1. Reasons for students leaving veterinary medicine with no award or a lower award than intended
Figure 2. The international nature of the RVC student cohort: 2010–2011 to 2014–2015 (source: RVC internal data)
Table 1. Undergraduate retention and attainment relevant to veterinary medical education (note that veterinary students accounted for 0.6% \[n = 9,135\] of the sample population)

<table>
<thead>
<tr>
<th>Retention issue</th>
<th>Summary of retention issue specific to veterinary medical education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mature students</td>
<td>Mature students across the sector are more likely to withdraw compared to traditional aged students, but this was not the case in veterinary medicine.</td>
</tr>
<tr>
<td>Male students</td>
<td>Retention of male students was not an issue in veterinary medicine (compared to other disciplines examined).</td>
</tr>
<tr>
<td>Students living within the EU before starting university</td>
<td>Students living in non-European countries before their studies were less likely to leave their programs (albeit a very small number: 2%, [n = 12]) than students living in the UK before their studies (4%, [n = 367]), whereas 6% ([n = 11]) of students from the EU left without their degree.</td>
</tr>
<tr>
<td>Distance from home</td>
<td>Veterinary students who attended a university within 30 miles of their pre-HE address were more likely to withdraw. This is in contrast to the finding across the sector, where selection of a university close to home had a positive effect on retention.</td>
</tr>
<tr>
<td>Exclusion</td>
<td>No veterinary students were recorded to have left HE due to exclusion.</td>
</tr>
<tr>
<td>Attainment issue</td>
<td>Summary of attainment issue specific to veterinary medical education</td>
</tr>
<tr>
<td>Gender attainment gap</td>
<td>Women in veterinary medicine were 13%–14% more likely to gain an upper degree than men.</td>
</tr>
</tbody>
</table>
Table 2. Profile of veterinary students

<table>
<thead>
<tr>
<th>UK veterinary students</th>
<th>Total veterinary students (n= 9,135)</th>
<th>Leavers without a degree (n=390)</th>
<th>Attainment of an upper degree (n = 575)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>% N</td>
<td>% N</td>
<td>% N</td>
</tr>
<tr>
<td>Traditional</td>
<td>71 6,465</td>
<td>5 290</td>
<td>63 458</td>
</tr>
<tr>
<td>Mature</td>
<td>29 2,626</td>
<td>4 100</td>
<td>70 117</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>21 1,951</td>
<td>4 76</td>
<td>53 78</td>
</tr>
<tr>
<td>Women</td>
<td>79 7,184</td>
<td>4 314</td>
<td>67 497</td>
</tr>
<tr>
<td>Socio-economic class (SEC)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One and two</td>
<td>32 2,944</td>
<td>3 90</td>
<td>66 188</td>
</tr>
<tr>
<td>Other SEC</td>
<td>26 2,376</td>
<td>6 133</td>
<td>64 210</td>
</tr>
<tr>
<td>Unknown</td>
<td>42 3,815</td>
<td>4 167</td>
<td>64 177</td>
</tr>
<tr>
<td>Parent HE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>33 3,045</td>
<td>3 105</td>
<td>71 202</td>
</tr>
<tr>
<td>No</td>
<td>25 2,308</td>
<td>6 143</td>
<td>67 203</td>
</tr>
<tr>
<td>Unknown</td>
<td>41 3,782</td>
<td>4 142</td>
<td>56 170</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black or black British Caribbean</td>
<td>0 12</td>
<td>8 1</td>
<td>0 0</td>
</tr>
<tr>
<td>Black or black British African</td>
<td>0 9</td>
<td>0 0</td>
<td>0 0</td>
</tr>
<tr>
<td>Other black background</td>
<td>0 1</td>
<td>0</td>
<td>0 100</td>
</tr>
<tr>
<td>Asian or British—Indian</td>
<td>0 37</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Asian or British—Pakistan</td>
<td>0 5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Asian or British—Bangladeshi</td>
<td>0 7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Chinese</td>
<td>0 14</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other Asian background</td>
<td>0 14</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Other ethnic background</td>
<td>2 159</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>White</td>
<td>87 7,931</td>
<td>4 350</td>
<td>65 521</td>
</tr>
<tr>
<td>Unknown</td>
<td>10 946</td>
<td>3 29</td>
<td>66 37</td>
</tr>
</tbody>
</table>
Table 3. Veterinary students who left with no award or a lower award than intended

<table>
<thead>
<tr>
<th>Criteria</th>
<th>% (% of all disciplines examined in 2010-11)</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completing a program</td>
<td>17 (20)</td>
<td>56</td>
</tr>
<tr>
<td>Failing academically</td>
<td>31 (29)</td>
<td>101</td>
</tr>
<tr>
<td>Health</td>
<td>4 (2)</td>
<td>13</td>
</tr>
<tr>
<td>Finance</td>
<td>2 (2)</td>
<td>7</td>
</tr>
<tr>
<td>Other personal reasons</td>
<td>24 (22)</td>
<td>78</td>
</tr>
<tr>
<td>Written off after time</td>
<td>3 (5)</td>
<td>9</td>
</tr>
<tr>
<td>Exclusion</td>
<td>0 (4)</td>
<td>0</td>
</tr>
<tr>
<td>Left for employment</td>
<td>4 (2)</td>
<td>13</td>
</tr>
<tr>
<td>Other</td>
<td>16 (4)</td>
<td>52</td>
</tr>
</tbody>
</table>