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How does student educational background affect transition into the first year of veterinary school? Academic performance and support needs in university education.

Short title: Veterinary student support

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Abstract:

The first year at university is critical in shaping persistence decisions and plays a formative role in influencing student attitudes and approaches to learning. Educational experiences, especially of secondary education and higher education (previous university education), will shape the students' ability to adapt to the university environment and the study approaches required to perform well in highly demanding professional courses such as medicine and veterinary medicine. The aim of this research was to explore the support mechanisms, academic achievements and perception of students with different educational backgrounds in their first year at veterinary school. Using questionnaire data and examination grades throughout the year, the effects upon student perceptions, needs and educational attainment in first year students with and without prior university experience were analysed to enable an in depth understanding of their differing needs. Our findings show that school leavers (successfully completed secondary education, but no prior university experience) were outperformed in early exams by those who had previously graduated from university (even from unrelated degrees). Large variations in student perceptions and support needs were discovered between the two groups: graduate students perceived the difficulty and workload as less challenging and valued financial and IT support higher. Each student is an individual, but ensuring that universities understand their students and provide both academic and non-academic support is essential. This research explores the needs of veterinary students and offers insights into continued provision and improvements that can be made to help students achieve their potential and allow informed 'Best Practice'.

Keywords:

Veterinary students, Assessment, Student support, Transition to university, Graduate students, School leavers.

Introduction:

The first year at university has been continuously identified as the most critical in shaping persistence decisions and plays a formative role in influencing student attitudes and approaches to learning [1-5]. Similar to medical students [6], veterinary students have added pressures compared to students on many other courses. Contributing to this are the course content and high work load; the wide range of skills required; the expectation to behave like a professional and to be judged accordingly; having to communicate effectively with a wide range of people and having to deal with emotions in difficult situations including life/death decisions. A five year degree course such as veterinary medicine, with extensive entry criteria and work experience requirements leads to a student group that is generally highly able, motivated and committed but also highly competitive and used to academic success. Degree completion rates in UK universities are generally high in medicine and veterinary medicine with attrition rates only around 5%, in contrast to the overall university attrition rate of around 17%. The reasons for leaving are usually accumulative and include [7]: inappropriate information to make course choice, poor transition to higher education, unclear academic expectations and lack of guidance, insufficient access to support, alienation and isolation, too many other commitments and financial pressure.

There are mixed views in the literature as to whether more mature students gain better or worse grades than younger students. 'Mature' is too broad an age spectrum, since two peak ages were observed in academic achievement; 18-19 years old and 26-30 years old [8]. This was confirmed in British veterinary science degrees in 1995 when statistics showed that 100% of under 21 year olds received a 'good' degree (classification of 1st or 2:1), but that this figure dropped to 76.6% in the 21-25 age group, and increased again to 100% in the 26-30 year old group [9]. Figures were not available for veterinary medicine, however medicine and dentistry showed that numbers attaining a 'good' degree decreased with age 89.5% in the under 21s, 88.4% in the 21-25 group, 63.6% in the 26-30 year olds and 66.7% in those aged 31-40 [9]. In contrast, other general studies suggested an increase in attainment until 36-40 years of age, with a decline thereafter [10]. In the medical field very

few studies have compared the academic performance of graduate students and school leavers (defined as those who had successfully completed secondary and further education, but no prior university experience) on the same curriculum, most studies focus on the accelerated graduate entry programs (GEP) in comparison to the traditional medical degree course, where course type and admission selection rather than graduate student attributes may explain differences [11-13].

It is often perceived by staff that graduate students may need less assistance or guidance as they have already experienced the transition to university [8,9,10]. However, the workload and structure of medical or veterinary degree courses might be a very different experience and still very challenging, especially if they require part time work to finance the course. Therefore it is important to understand the perceptions and needs of students with degrees and also to understand whether they achieve the same grades as school/college leavers. The aim of this study is to investigate the impact of prior education on the academic performance, perception of first year of the veterinary medicine and science course and support requirements of first year students at veterinary school.

Materials and Methods

Student cohort: The student cohort on the five year BVMBVS with integrated BVMedSci at The University of Nottingham consisted of 109 students. In order to gain entrance into the veterinary school, all students applied through the British UCAS system and completed a questionnaire specific to this veterinary school. All students were either interviewed in a 3-part interview process (interview with academic & clinical staff; practical aptitude test and team working task) or a telephone interview was performed (for some international students) with a basic scientific and clinical academic staff member.

Student performance: In first year of the course, students performed summative assessments in all modules within a systems based teaching curriculum. Teaching consisted of four block modules (Musculoskeletal (MSK), Lymphoreticular Cell Biology (LCB), Cardiorespiratory (CRS), Neuroscience (NEU)) and two long modules (Animal Health and Welfare (AHW) and Personal and Professional skills (PPS)); except for PPS, all modules were assessed online by multiple and extended choice questions (66%), short answer examinations termed spot tests (33%) and assessment of practical skills termed objective structured practical examinations (OSPE, pass/fail). PPS was assessed by coursework (100%), portfolio (pass/fail) and a skills diary (pass/fail). There were two assessment points, the first two modules, MSK and LCB, were assessed in January in the first week of the academic term and the other modules as well as all OSPEs were assessed at the end of the academic year (June). Prior to the summative assessments, students had the opportunity to participate in formative assessments covering all assessment methodologies used.

Examination results were analysed and the performance of 'graduate' vs 'school leaver' students were compared: (1) overall year 1, (2) each module, (3) for all modules (except PPS) computer based assessment and spot test, (4) number of re-sits and (5) number of students that failed to progress after re-sit. Admission into the university was via one of three routes –preliminary year, straight into first year or a 'Gateway' year. The University

'preliminary year' in veterinary studies required AAB grades from any 'A' level subjects but is specifically for students who did not take an 'A' level in either biology or chemistry. Students accepted into the first year had achieved 'A' level grades including A for biology, A for chemistry and at least grade B in any other subject excluding general studies. The 'Gateway' further education college course required grades B,B & C at 'A' level and students were taught in a different location to the veterinary school.. The 'preliminary year' students were taught within the veterinary school higher education environment, and were therefore grouped with the graduate students as they had encountered a university lifestyle and education system prior to starting the veterinary degree. School leavers were defined as those who had successfully completed secondary and further education, but had no prior university experience. 'A' level grades achievable are A*-E and unclassified (fail). A unified marking scheme is used to compensate for examination paper difficulty. The maximum points available are 600 and A* represents 480 points or above plus over 90% of unified marks in a set number of examination papers, A 480 points or above, B 420-479 points, C 360-419 points.

Questionnaire: A voluntary questionnaire was given to all students in the final term of the first year as part of a Personal and Professional Skills (PPS) teaching session. Research was carried out following approval of the study and the questionnaire from the 'Human Subjects Institutional Review Board'. All questions and the student responses are summarized in Tables 2 and 3. Students were asked 1) to evaluate a number of statements with regards to their first year experience (adapted from Powers et al. [14] on a linear visual analogue scale (0-100 mm; thus ensuring that a continuum is provided rather than discrete jumps as categorization would provide) from 'strongly agree' to 'strongly disagree', the neutral midpoint was marked; 2) to evaluate a range of support services (peer, veterinary school and university support) on a linear visual analogue scale (0-100 mm) from 'very important' to 'not important at all', the neutral midpoint was marked; 3) a number of open questions including 'Please add any further comments you have about

how well your prior experience of education (school in general/subjects studied/previous degrees etc.) prepared you for this year', 'What could be improved in terms of the support given to students?' and 'Please give any further comments regarding your experiences this year and the support systems in place'. The linear visual analogue scale responses were measured manually by ruler. The support systems that students evaluated are shown in Table 3 and consisted of those offered by the veterinary school, those offered by peer interactions and those offered as general services by the university.

Statistical analysis: To measure the internal consistency, and hence the reliability of the questionnaire, Cronbach's Alpha coefficient was determined. Questionnaire responses and assessment results of graduates and non-graduates were compared using the non-parametric statistical test Mann-Whitney U, two tailed with 95% confidence interval. P-values of less than 0.05 were deemed significant.

Results

Impact of admission process on student cohort

Of the 1366 applicants to the five year BVMBVS with integrated BVMedSci, 11% (155) were classified as graduates and 89% (1211) as school leavers. 5% (14) of the 304 applicants invited to interview, were graduate students. Of the 133 offers made, 8% (10) were to graduate students. The final BVMBVS cohort contained 23% (26) graduate students from 111 students. In addition, to the 10 'graduate' students selected at interview, 16 students were admitted from the preliminary course, located at University of Nottingham School of Veterinary Medicine and Science, and were grouped together with the graduate students. Five students were admitted from the Gateway course and were considered as school/college leaver status. Two non-graduates deferred entry. This data is also shown in Table 1.

Perception of 1st year experience according to previous education

The return rate for the questionnaires was 94% (103 out of 109 students), however not all students answered all questions. The estimated reliability (coefficient alpha) of a composite score based on all 16 items was 0.62, which is higher than the acceptable values of 0.5 [14,15]. The cohort responses regarding their first year experience are summarised in Table 2. The whole student cohort strongly agreed that they were 'learning a lot' and 'were confident to participate in all tasks in practical teaching' and agreed that they had 'felt overwhelmed at the workload' but 'teaching had been clear and understandable' and that they were 'satisfied with progress in learning the knowledge and skills required for a veterinary medicine degree'.

School leavers were more likely to feel that the course was too hard for their ability (median=72.5 for graduates vs 56 for school leavers, p=0.01; medians calculated from a visual analogue scale 0-100 mm from '0=strongly agree' to '100=strongly disagree', all ranges are shown in corresponding Tables 2 and 3) and less likely to agree that they had relatively little difficulty understanding course material (median=39.5 for school leavers

vs 50 for graduates, p=0.0006). Despite the increased level of school leavers finding the work more difficult, it was also clear that school leavers felt that their school experience had prepared them well for studying at university in comparison to graduates (median=39 for school leavers vs 21 for graduates, p=0.01). There were no comments pertaining to how the students felt that school had prepared them, whether it was academic, personal, organisational or life skills that they were thinking about (Table 2).

Free text answers illustrated that some students strongly felt that school had not prepared them for university education. Quotes included: 'the sixth form way of teaching is different to university and I don't feel I was initially prepared by my sixth form', 'school only scratched the surface of most topics so I found a huge jump from what I knew to what I was expected to know', 'none of my previous experience prepared me to manage my time effectively in order to cope with the large workload', and 'at school we were generally spoon fed in the science subjects, which in some cases has been a disadvantage when suddenly being very independent at university'. One person stated that 'subjects studied (biology, maths, chemistry) has given me a good ground knowledge which new material has built on. The learning technique [at university] is a lot more independent whereas in school was more 'spoon-fed' and about achieving grades rather than understanding the content'.

Students that reached the course through the veterinary school based preliminary or Gateway years generally felt better prepared for the veterinary course, which was also reflected in their free text comments: '[I] think Gateway course had good content however there weren't many practicals with animals & most staff were not very supportive', 'The Gateway course helped me significantly & improved my confidence' and 'There are many topics I had not covered in school before I came here. Some topics I have covered in the Gateway course which has helped this year. None of my previous experience prepared me to manage my time effectively in order to cope with the large workload. I have found that a lot of lecturers presume we have already learned many topics and so the basics in that area are not explained – just the more complicated in depth areas.'

214

215 *Support mechanisms based on previous education*

216 The students were asked to rate their support systems ranging from peer support and the
217 tutor system to veterinary school specific support and the university support systems. All
218 data (median and ranges) are summarized in Table 3. All groups of students (school leaver
219 or graduate) placed the 'extramural placements office' at the top of their support systems,
220 with personal tutor and the School reception always present in the 'top five' rated support
221 systems. The student ratings of support were generally very similar between graduates
222 and school leavers. A few notable exceptions were observed: the school leavers rated the
223 'student-IT-helpdesk' service more highly than graduates (median=32 for school leavers
224 and 16.5 for graduates, p=0.04), while the university financial support service was more
225 highly rated by graduates (median=29 for graduates in comparison to 50 for school
226 leavers, p=0.04). The ranked data (Table 4) showed that the school leavers found the
227 tutor family (two academics assigned to around 6 students per cohort plus one senior tutor
228 per cohort), welfare drop-in session and the peer support of other students more useful
229 than the graduate students did.

230

231 *Academic achievement based on previous education*

232 Of the 109 students, 107 participated in the assessments at the first assessment point
233 (MSK & LCB), two students had extenuating circumstances and their assessment results
234 were obtained from their first sit in the re-sit period (August). All students participated in
235 the second assessment point (June).

236 All examination grades (online and spot test; Fig 1) from the six modules of the first year
237 of the veterinary medicine degree course were evaluated. The graduate students gained
238 significantly higher grades than the school leavers in the assessments at the first
239 examination time point: MSK spot test (median=61% graduate and 51% for school leaver,
240 p=0.02), in the LCB exams (online: median=70% graduate, 61% for school leaver,

p=0.04, spot: median=66% for graduates vs 61% for school leavers, p=0.02), leading to significantly better overall marks for these two modules (MSK: median=66% for graduates vs 50% for school leaver, p=0.04; LCB: median=69% for graduates vs 62% for school leaver, p=0.01), While there were no significant differences in assessment performance at the second assessment point, the earlier enhanced performance was still significantly reflected in the overall year 1 grade (median=68% for graduates and 61% for school leavers, p=0.03; Table 5a and Fig 1). When international students (three graduates & 19 school leavers) were excluded from this analysis, graduate students still performed better than school leavers but the differences were no longer significant (Table 5b). Comparing the end of year performance per grade bracket, most graduate students were in the 70%+ bracket followed by the 60-69% bracket, compared with the school leaves where most students fell within the 60-69% bracket followed by the 50-59 bracket (Fig 2).

Discussion

First year learning experience and performance

Our study has clearly highlighted that in the first year of a veterinary medicine degree, initially graduate students perform better with significantly higher marks in the first assessment point leading to a year 1 overall mark 10% (on average) higher than that of school leavers. This supports the view that graduate students are already familiar with the university environment and the study approaches required to perform well. The only study comparing academic performance of gradate entry and school leaver entry medical students completing the same pre-clinical curriculum and assessments, showed that graduate entry students performed significantly but only marginally better than school leavers over all four bioscience knowledge assessments [17]. However, in that previous study, students were only included if they passed the subject on their first attempt with the reasoning that a fail may not reflect their academic ability but may be due to health or personal reasons [17]. In our study all assessment performances were included, except for students with valid medical or personal extenuated circumstances that had their exam

performance annulled if failed. While a fail in first year assessments may not be a true reflection of the students' knowledge, if no extenuated circumstances are present, it very likely reflects their difficulty in transition to the veterinary course, be it the difference in teaching delivery, independent learning, work load or the university environment as a whole. Our data clearly show that graduate students perform significantly better in the early assessment point but by the second assessment point this difference in assessment results is diminished. Some of this academic advantage may be due to prior obtained scientific knowledge but since this advantage is most likely in the early part of first year it suggests that prior experience of tertiary education is an important factor. This is similar to the outcomes of a study comparing knowledge assessment outcomes between graduate students on a four year UK Graduate Entry Programme (GEP) for medicine with those of a conventional five year program, showing that the GEP students performed significantly better than both, school leavers and graduate students, on the five year course [12]. This better performance may be due to differences in selection policy, structure of teaching, academic support, or the course working environment [12], however, no data were presented or discussed comparing the performance of graduate students and school leavers within the 5 year course. Further data analysis showed that this difference is mainly due to international students in the school leaver group, confirming again that transition to university is challenging, especially if that also means a different cultural or language environment.

In contrast to the marked difference in student performance, the perception of their first year experience is very similar for both groups, reflecting that the veterinary medicine degree course has a higher workload and faster pace than some other degree courses. The main differences include that graduate students are more confident in their ability to cope with the course and to understand the course materials.

Student support

Student support is very important since the pressures listed above and the associated stress can lead to mental health problems. Up to a third of students surveyed in their first year at a veterinary school reported clinical levels of depression and elevated anxiety levels [18, 19]. The main causes reported for that were homesickness, academic concerns, difficulty fitting in with peers and poorer perceived physical health. The University of Nottingham and the School of Veterinary Medicine and Science offer a range of support systems to avoid the escalation of stress and anxiety levels. However the rating of those support systems by the students is variable, probably reflecting the perceived personal need for the support offered. This study showed that school leavers were more likely than graduates to feel that their school experience had prepared them well for university. This would certainly be worth further investigation in order to further comprehend which skills are perceived as being useful by both sets of students, in order to inform higher education institutions. It was noted in our results that 'graduates' are less likely to rate tutor family or their peers highly within their support network. It is possible that these students rely on mechanisms such as family/friends in their personal life, more than school leavers, but it is also important to highlight that 'friendships and social networks' have been found to be important factors relating to student retention [20]. Would 'mature students' benefit more from being in mixed age tutor groups or 'mature student only' tutor groups? Support tailored towards mature students has been suggested. In 2011, the British government highlighted the need to both attract and support mature students [21]. It has also been observed that financial problems, confidence in ability and perceived lack of support from teaching staff, caused problems for 'non-traditional learners', including mature students [22]. Specialised support programmes for mature students, staff awareness training, a mature student survival guide and orientations aimed at mature students have also been suggested in order to assist in forming peer networks and support systems [23]. On the other hand graduate students have the additional costs of the second degree. Compared to school leavers, university financial support services are seen by graduate students as a more important university support system even in year 1. Financial pressures will potentially increase over the five year course, especially due to EMS and clinical EMS

leading to less opportunities to work in teaching free times and also increased costs in addition to the very intensive fifth year rotations. In addition, some of these graduate students are more likely to have differing family and financial responsibilities (for example partners, children, act as carers for parents, mortgages, differing loan and/or bursary opportunities), and are more likely to have been in the workplace and have taken a large drop in wages, in comparison to school/college leavers. The long term impact on the increase in fees at UK universities especially in the long and intense courses such as medicine and veterinary medicine still needs to be established. While medicine and veterinary medicine are professional degrees with currently good employment opportunities, it needs to be shown in the future if studying those courses as a second degree is financially viable.

Higher Education Institutions are experiencing increased governmental, institutional and market pressure to achieve high standards in education, whilst also providing higher levels of support, especially as education increases in price [6]. This has led to the view that students have become 'customers' rather than beneficiaries of tertiary education [6]. Hence universities have to find a balance between listening to their students and acting upon student feedback, thus ensuring that they attract, and maintain the best students but also, maintain educational standards so that degrees are not simply obtained because a student pays enough money. It is known that the financial return of a degree depends upon the degree subject, institution attended, and degree class obtained, it is therefore essential that all students are provided with an equal chance through the university support systems to excel at their studies and enhance their lifelong chances of financial reimbursement for their studies. This is especially important for graduate students that invest into a very long secondary degree program with little opportunity to work in lecture free time due to work placements.

In a Finish study on first year students' perception and performance in an macroscopic anatomy module (one of the first modules) prior university experience did not significantly improve performance but reduced stress levels [24]. While a number of first

year students in countries such as the US already have a degree and hence experience of the university learning environment, the intensity of the course program, the time commitment, large amount of information to learn and memorize can still be very challenging [25,26]. The impact of this high workload may also reflect surface approaches to learning, which is negatively associated with grades achieved in assessments [27].

A descriptive study like this has some limitations that need to be acknowledged. This study was performed in a UK university with the majority of students moving straight form secondary education to university, which is common in European countries but different to countries such as the US where students that enter veterinary medicine have already obtained an undergraduate degree. However, the recommendations for graduate students will still be relevant. While a high return rate for the questionnaire, only very few students answered the free text questions and hence no qualitative analysis was possible. Focus groups and face-to-face interviews might have yielded more in depth information. The sample size was relatively small, so caution should be used when generalizing these data.

Recommendations/educational implications

- Information about support systems needs to proactively be highlighted at several time points throughout first year, especially near revision and exam result release times, to ensure that all students are aware of the support available.
- Ensure an atmosphere whereby to identify problem areas and to seek help/support is seen as a strength and a sign of good professionalism.
- University support needs to be aware of specific needs/stress points of veterinary students, especially around time management and work load in comparison to some other degree courses in order to provide suitable coping strategies as well as academic and financial advice.
- Tutors and welfare staff need to be aware that graduate students, although familiar with the university environment may still find the workload and time

intensive teaching of the veterinary curriculum overwhelming. In addition, financial support options and coping strategies should be pro-actively discussed with graduate students

Summary and conclusions

It has previously been suggested that 'treating people fairly does not mean treating people in the same way - we need to recognise difference and respond appropriately' [28]and it is the conclusion of this study that graduate students and school leavers have very differing educational and support needs, and that education providers need to be aware of these differences in order to respond and provide accordingly.

Understanding the requirements and abilities of students who have prior university experience is very important. As shown in our study, initial transition into the highly demanding veterinary degree course is towards the end of first year perceived by graduate students as easier with regards to course material and prior knowledge compared to school leavers. This is also reflected in assessment performance, with significantly better results in the early assessments leading to significantly better grades at the end of year 1 compared to school leavers, even though the performance of both groups of students was the similar in the end of year assessments.

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Table 1. Background education status of students applying to veterinary medicine through to the final cohort

	School Leaver	Graduate
Applicants to Veterinary Medicine n=1366	1211 (89%)	155 (11%)
Offers made by the university to study veterinary medicine n=133	123 (92%)	10 (8%)
Admitted via Gateway course and preliminary course n=21	5 (24%)	16 (76%)
Number of offers accepted n=111*	85 (77%)	26 (23%)
Final cohort n=109	83 (76%)	26 (24%)

*Two school leavers deferred entry for one year

Table 2 Student rating of learning experiences

	Educational background		
Learning experience (LE)	School leaver N=76	Graduate N=26	P value
1 I am learning a lot in my 1st year at University	2 (0-100)	2 (0-23)	
2 I have felt overwhelmed by the workload this year	26 (0-100)	32 (0-87)	
3 My lecturers' teaching has usually been clear and understandable	25 (0-81)	28.5 (0-50)	
4 The pace at which the material has been covered has been too fast	42 (0-90)	45 (16-87)	
5 I am less confident than other people to voice my opinion in self directed learning sessions.	67 (2-100)	61 (23-100)	
6 I am not confident enough to voice my opinion in lectures/seminars.	50 (0-100)	57.5 (0-100)	
7 I feel confident to participate in all tasks in practicals.	11 (0-100)	18.5 (0-100)	
8 For my ability (or level of preparation), the course seemed too difficult	**56 (0-100)**	**72.5 (41-100)**	**0.01**
9 This year has been too stressful	50 (0-100)	50 (12-100)	
10 The academic requirements have been too demanding	50 (0-100)	50 (22-100)	
11 I have had relatively little difficulty understanding course material	**50 (2-100)**	**39.5 (4-71)**	**0.0006**
12 The demands on my time and energy have been excessive	43 (0-100)	42.5 (0-86)	
13 I am satisfied with my progress in learning the knowledge and skills needed for a veterinary medical degree	25 (0-84)	23.5 (0-60)	
14 The personal tutor system provides good support.	21 (0-100)	39 (0-66)	
15 My school experience in general prepared me well for my study at University.	**43 (0-100)**	**50 (0-100)**	**0.01**
16 My A-Levels prepared me well academically for my study this year.	35.5 (0-100)	49 (0-100)	
17 My previous degree prepared me well academically for my study this year.	N/A	39 (2-100)	

Values indicate median rating (minimum–maximum rating) with options ranging from strongly agree (0) to strongly disagree (100), with neutral at 50. N/A=not applicable. Mann-Whitney U test, two tailed with 95% confidence interval; P values have been given where statistically significant difference.

Table 3 Student ratings of support

	Educational Background			Whole cohort
Student support	School leaver n=76	Graduate n=26	P value	Not aware of service (from n=103)
1 School service - Personal tutor	20 (0-89)	21 (0-71)		0
2 School service - Tutor family	39 (0-100)	50 (0-100)		0
3 School service - Senior tutors	50 (0-100)	34 (0-90)		6
4 School service - Reception	21 (0-73)	16 (0-58)		0
5 School service - Welfare officer	28 (0-100)	27 (0-72)		0
6 School service - Welfare drop-in session	50 (0-100)	50 (0-100)		0
7 School service - Extra mural studies (EMS) placements office	0 (0-50)	0 (0-23)		1
8 School service - Disability officer	50 (0-100)	49 (0-100)		9
9 School service - Teaching, learning and assessments (TLA) office	19.5 (0-100)	15.5 (0-54)		1
10 Peer support - Other students	5 (0-50)	23 (0-50)		1
11 Peer support - Veterinary society (VetSoc)	34 (0-100)	39.5 (0-100)		0
12 University services - Academic support services	50 (0-100)	32.5 (0-100)		11
13 University services - Counselling services	50 (0-100)	45.5 (0-100)		10
14 University services - Financial support service	**50 (0-100)**	**29 (0-56)**	**0.04**	8
15 University services - Student-IT helpdesk	**32 (0-100)**	**16.5 (0-100)**	**0.04**	5
16 University services - Face-to-face IT support (library)	28.5 (0-100)	24 (0-100)		8

Value represent median (minimum-maximum rating) with options ranging from strongly agree (0) to strongly disagree (100), with neutral at 50. Statistical significance ($P<0.05$) was analysed using Mann-Whitney U test, two tailed with 95% confidence interval, and is indicated where significant. Welfare officer refers to a member of administrative staff who is available to students and can provide non-academic guidance and advice.

Table 4 Support systems ranked

	Educational Background	
Student support Ranking	School leaver	Graduate
1 School service - Personal tutor	4	5
2 School service - Tutor family	10	**15**
3 School service - Senior tutors	11*	11
4 School service - Reception	5	3
5 School service - Welfare officer	6	8
6 School service - Welfare drop-in session	11*	**15**
7 School service - Extra mural studies (EMS) placements office	1	1
8 School service - Disability officer	11*	14
9 School service - Teaching, learning and assessments (TLA) office	3	2
10 Peer support - Other students	2	**6**
11 Peer support - Veterinary society (VetSoc)	9	12
12 University services - Academic support services	11*	10
13 University services - Counselling services	11*	13
14 University services - Financial support service	11*	9
15 University services - Student-IT helpdesk	8	**4**
16 University services - Face-to-face IT support (library)	7	7

*=ranked jointly, ranking data was extrapolated from the rating data given by the students.

Table 5a Examination grades (all students)

Module	Exam Type	Graduate n=25	School leaver n=87	P value
MSK Musculoskeletal[1]	Online	69 (51-93)	64 (42-84)	-
	Spot	**61 (42-84)**	**51 (22-76)**	**0.02**
	Module overall	**66 (46-88)**	**60 (36-81)**	**0.04**
LCB Lymphoreticular Cell Biology[1]	Online	**70 (32-87)**	**61 (32-87)**	**0.04**
	Spot	**66 (47-86)**	**61 (25-89)**	**0.02**
	Module overall	**69 (41-81)**	**62 (35-84)**	**0.01**
CRS Cardiorespiratory[2]	Online	64 (41-82)	59 (37-79)	-
	Spot	64 (32-81)	62 (34-83)	-
	Module overall	66 (39-82)	60 (38-81)	-
NEU Neuroscience[2]	Online	67 (0-90)	64 (35-84)	-
	Spot	72 (31-88)	64 (24-91)	-
	Module overall	69 (10-90)	63 (31-86)	-
AHW Animal Health and Welfare[2]	Online	70 (48-83)	66 (43-81)	-
	Spot	63 (33-89)	59 (22-81)	-
	Module overall	68 (48-82)	64 (38-77)	-
PPS Personal, Professional Skills[3]	IT project	70 (51-77)	67 (45-83)	-
Overall Grade		**68 (40-83)**	**61 (18-81)**	**0.03**

Values indicate median (minimum-maximum) examination percentage

P-value only shown if significant, $P<0.05$, based on Mann-Whitney U test. [1] 1st assessment period (January); [2] 2nd assessment period (June); [3] course work during term time.

458 **Table 5b Examination grades (international students excluded)**

Module	Exam Type	Graduate n=21	School leaver n=68	P value
MSK Musculoskeletal[1]	Online	68 (49-93)	67 (43-84)	-
	Spot	60 (32-79)	53 (35-77)	**-**
	Module overall	66 (43-88)	62 (43-81)	**-**
LCB Lymphoreticular Cell Biology[1]	Online	71 (44-85)	63 (45-87)	**-**
	Spot	69 (29-80)	62 (25-89)	**-**
	Module overall	69 (45-81)	63 (46-84)	**-**
CRS Cardiorespiratory[2]	Online	65 (41-79)	60 (37-83)	-
	Spot	64 (32-76)	64 (34-83)	-
	Module overall	66 (39-76)	63 (38-82)	-
NEU Neuroscience[2]	Online	67 (0-90)	64 (35-86)	-
	Spot	65 (31-88)	66 (24-91)	-
	Module overall	69 (10-90)	65 (31-86)	-
AHW Animal Health and Welfare[2]	Online	69 (50-80)	67 (43-83)	-
	Spot	63 (48-89)	63 (22-85)	-
	Module overall	65 (56-77)	65 (38-82)	-
PPS Personal, Professional Skills[3]	IT project	70 (56-77)	68 (45-83)	-
Overall Grade		66(18-83)	63(40-82)	**-**

459 Values indicate median (minimum-maximum) examination mark (percentage). - P-value
460 only shown if significant, $P<0.05$, based on Mann-Whitney U test. [1] 1st assessment
461 period (January); [2] 2nd assessment period (June); [3] course work during term time.
462

Figure captions:

Figure 1: Examination grades throughout the year. Examination results for the first sit assessments in each of the modules in the first year of study. Non-parametric statistical test Mann-Whitney U, two tailed with 95% confidence interval was used and * indicates $P<0.05$.

Figure 2: End of year examination grade position. End of year grade and percentage of students within both School leaver and graduate groups achieving over 70% (1^{st}), 60-69% (2.1), 50-59% (2.2) and under 50% (traditionally 3^{rd} but a failure to continue in veterinary medicine).

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