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**Citation for published version:**

Paterson, J, Keys, C, Phillips, K, Yntema, M & MacKay, JRD 2019, 'Peer-led academic support for pre-arrival students of the BVM&S Degree program', *Journal of Veterinary Medical Education*, pp. 481-488. <https://doi.org/10.3138/jvme.1017-149r>

**Digital Object Identifier (DOI):**

[10.3138/jvme.1017-149r](https://doi.org/10.3138/jvme.1017-149r)

**Link:**

[Link to publication record in Edinburgh Research Explorer](#)

**Document Version:**

Peer reviewed version

**Published In:**

Journal of Veterinary Medical Education

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1 **Peer-led academic support for pre-arrival students of the BVM&S Degree**

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26

27 **Abstract**

28 Mental health challenges are of growing concern to the veterinary community. Within veterinary  
29 education, there has been increasing focus on building resilience in students, and identifying likely  
30 stressors, such as the transition into the veterinary curriculum for first year students. In this study, we  
31 evaluated a peer-led project to provide pre-arrival materials for incoming students. Through a combination  
32 of learner analytics and post-course surveys, we investigated usage of resources and the effects on  
33 student's attitudes to the veterinary curriculum. Over the two years the course has been running, 159  
34 students (64% of total) visited the course, but only 39% (n = 98) actively engaged with the materials. The  
35 course was most frequently accessed from Friday to Sunday (53% of visits), and over 50% of the visits  
36 occurred one week prior to arrival. The post-course questionnaire in the first year of the course's delivery  
37 had a 17% response rate (n = 24) and most students (71%) reflected on feeling anxious about beginning  
38 their studies. 88% said they felt they had benefited from the material's availability. While not all students  
39 used the resources, providing peer-led teaching opportunities at high-stress points is an effective method  
40 of easing transitions.

41

42 **Introduction**

43 Among the upcoming challenges facing the veterinary profession, the British Veterinary Association (BVA)  
44 anticipates an increasing need for more veterinary graduates, while acknowledging the need for revised  
45 curriculums and supporting student mental health (1). This may partly be addressed by new veterinary  
46 schools, for example, the UK has recently seen proposals for a ninth veterinary school(2), but there have  
47 also been calls for veterinary schools to review their role in retention of vets within the profession (3).

48 The challenges facing the veterinary profession are multifaceted, and so both veterinary schools and  
49 industries need to examine how they intend to address these challenges. For veterinary schools, one  
50 important aspect is the development of resilience in veterinary students (4). Schools are seeking to

51 improve 'psychological capital', equipping students with the skills to thrive in the changing veterinary  
52 career. Exploring mental health, and points of stress within the veterinary curriculum, is one way of  
53 identifying where such skills need to be taught, and improving the experience of the veterinary student  
54 population. While there are many aspects of the veterinary degree which can be stressful, periods of  
55 transition can be especially problematic. The transition from students years into practice have been  
56 referred to as 'make or break' (5), with only 46% of New Zealand students surveyed responding that their  
57 education had left them well-prepared for practice. Despite this, the same survey found that most  
58 employers considered the graduates to be "reasonably practical and [have] a solid theoretical background".  
59 Students may feel less capable than they truly are. This mismatch in student perception of their own ability  
60 has been recognised elsewhere, and been linked to the high prevalence of mental health issues within the  
61 veterinary profession (6). There is some evidence that those students who apply for veterinary school are  
62 extremely driven individuals. One study explored the narratives student and newly-qualified veterinarians  
63 use to discuss their career, and recognised that often getting accepted to veterinary school was seen as an  
64 end goal, instead of the beginning of a new career (7). Many of these students develop an identity which is  
65 structured around their academic achievements or determination to become a vet. This has been  
66 considered a risk factor for the development of fixed mindsets (8), where students base their self-worth on  
67 their intelligence. Veterinary students with fixed mindsets have been found to be at more risk for mental  
68 health challenges (9).

69 The transition into higher education is a stressful event, and could easily be considered the first great  
70 stressor of veterinary school. Life events can be stressful even if they are considered to be 'normative' or  
71 an expected transition, such as moving house, particularly for adolescents (10). Generally speaking,  
72 transitions into higher education are considered stressful for a number of reasons, including changes in  
73 home life (11), financial considerations and resulting work-life balance (12) and changes to the way in  
74 which students are expected to learn (13). 'Learning to learn' is a common phrase used to summarise the  
75 challenges some students face when moving into higher education, where different learning contexts and

76 perceptions of the student role in university can result in new first year students struggling to transition  
77 into the higher education learning environment. To support this transition, pre-arrival courses have been  
78 found to increase student engagement, better manage the information 'overload' in the early weeks,  
79 encourage student self-reflection, and relieve student anxiety (14).

80 In this study, a pre-arrival course was created by present students for incoming students. Peer to peer  
81 teaching can have wide-ranging benefits, improving not only the recipient's learning and school  
82 community, but also helping to reinforce the knowledge of the tutors (15). The study aimed to investigate  
83 how such pre-arrival resources were used, for example, how many incoming students would make use of  
84 such a resource, and when would they find those resources most useful. The study also explored attitudes  
85 to the pre-arrival resources, such as how useful they were perceived, and impacts on attitudes to  
86 veterinary school.

87

88

## 89 **Materials and Methodology**

### 90 *Peer-led learning support*

91 At the R(D)SVS, a Veterinary Peer Assisted Learning scheme (VetPALs) aims to support first year students by  
92 providing a number of sessions on both generic study skills and specific veterinary curriculum knowledge  
93 led by students from later years (16). Three students were recruited through this scheme (CK, KP & MY) to  
94 assist in producing resources for the pre-arrival project. KP and MY conducted their research into this  
95 course as part of the research component of their BVM&S degree.

96

### 97 *Resources and Access*

98 To identify elements of the first year BVM&S course that new students may potentially find challenging, a  
99 number of discussions were held with science staff at a sixth form college in England to identify gaps in

100 medical-related knowledge in the A-Level Science subjects. Current specifications from the Assessment and  
101 Qualifications Alliance (AQA), which works across England and Wales, explore few medical applications of  
102 knowledge (17). The Scottish Qualifications Authority's Curriculum For Excellence has recently reviewed  
103 the Higher Biology curriculum, and incorporated a number of medical and animal welfare learning  
104 outcomes (18), however as authors on this paper (JM) were involved in providing support to Higher Biology  
105 teachers in 2015 for teaching these topics, in the authors' opinion the intake of students in August 2015  
106 would have limited exposure to this material. As a result, CK, KP and MY developed three sets of resources  
107 based off their own understanding of the challenging elements of the BVM&S programme.

108 The student intake given access to the Pre-Arrival scheme was Academic Year 2015, with resources being  
109 made available on the 20<sup>th</sup> August 2015 (Study Day -18), with students beginning their programmes on the  
110 20<sup>th</sup> September (Study Day 1), and the study ran for 177 days (Final Study Day 158).

111 Three sets of resources were produced (**Table 1**) covering different aspects of the programme and were  
112 reviewed by staff members responsible for delivering associated content to check for errors. A number of  
113 resources were created by the project, mostly as Articulate Storyline Packages (Articulate Global Inc., 2014,  
114 New York), an e-learning software which produces interactive flash-based presentations incorporating  
115 slides and narration. External resources were also linked to, including a number of videos from Khan  
116 Academy and a 3D Model of a Eukaryote Cell, the 'Glass Cell', published in Sketchfab. The actual resources  
117 were based around introducing terminology and basic concepts and did not include formal learning  
118 objectives as it was felt this built in a level of formality that was considered inappropriate. Instead the aim  
119 was to provide more an insight and view of some of the first year content with the pre-arrival students  
120 encouraged to work through the materials any way they wished. For some this would re-enforce things  
121 they had covered before, while in others it provided an insight and some background to content to be  
122 delivered once they were on campus. It was never thought that the materials would be comprehensive or  
123 anything beyond giving some early "heads up" on materials to be covered.

124 (Table 1 approx here)

125 *Evaluation*

126 Student usage of materials was tracked via learner analytics for intakes 2015-2016, and 2016-2017 at a  
127 course level (e.g. how often/frequently students interacted with the course pages, not individual  
128 resources), characterising the proportion of time students spend on the pre-arrival course across all  
129 materials. The Anatomy and Histology resources were specifically tracked during the Study Period, enabling  
130 reporting at a resource level. The 2015-16 Students were surveyed after arrival (Study Day 63-Day 113) as  
131 part of CK, KP and MY's research projects to retrospectively explore whether students felt the pre-arrival  
132 materials had helped. Later cohorts were not surveyed because CK, KP and MY had concluded their studies.  
133 The survey was delivered via Survey Monkey and contained 24 questions asking participants to rate their  
134 agreement with a variety of statements regarding the resources, and some free-text response questions.

135

136 **Results**

137 *Student Use of Peer-Provided Resources*

138 Over the two years that the pre-arrival course has been running, 249 students have been offered access, of  
139 which 90 students (36%) never accessed the course. Students were considered 'active' on the course if they  
140 had spent more than 5 minutes on the course page. In 2015-16, there 62 (48%) active students on the  
141 course who spent an average of 1.5 hours ( $\pm 3.39$ ) on the course. In 2016-17 there were 36 (30%) active  
142 students who spent on average of 1.2 hours ( $\pm 1.42$ ) on the course. There were no significant differences  
143 between year groups in how much time was spent on the course ( $F^{1,96}=0.262$ ,  $P=0.61$ ). The course was  
144 most frequently accessed on a Friday (27% of time), with Saturday (16%) and Sunday (10%) following  
145 (Figure 1).

146  Figure 1 approx here

147 *Detailed Use of Anatomy & Histology Resources*

148 All four pre-arrival lectures showed extremely high consistency in visit numbers (Cohen's Kappa ranging  
149 from 0.95-1.00) indicating that no one resource was favoured over the others by the students. Collectively,  
150 the resources were visited 213 times over the 177 day study-period with over 50% ( $n=109$ ) of visits  
151 occurring before Day -7 (**Figure 2**), one week prior to arrival. The majority of visits occur in the PM period  
152 (75%,  $n=158$ ) with the largest peaks at lunch time and immediately after the working day. Student access  
153 during the week was fairly consistent with a slight uptick in popularity during the weekend (36%,  $n=76$ ).  
154 Approximately half of the students with access (51%,  $n=73$ ) never used the resources and a further 44%  
155 ( $n=62$ ) used the resources between 1 and 5 times. Only 5% of students ( $n=7$ ) used the resources more than  
156 five times over the study period.

157

158  Figure 2 approx here

159



160

161 *Student Experience of Resources*

162 24 students responded to the pre-arrival survey (16.9%), with demographics shown in Table 2. Only 79%  
163 (n=19) participants had accessed the pre-arrival course, however the five respondents who had not  
164 accessed the materials were still considered useful data as they reported on their attitudes to starting the  
165 BVM&S degree.

166 (Table 2 approx here)

167

168 Most students (33%) were not confident or unsure (38%) about starting the BVM&S programme prior to  
169 arrival, with 83% anxious about the academic side of vet school and 71% anxious about the social aspects  
170 of university. The pre-arrival material was not necessarily able to reassure students, with 63% of student  
171 unsure or disagreeing that the material increased their confidence, but 88% thought the pre-arrival social  
172 information was useful and 79% said they had benefited (**Figure 3**). The Anatomy & Histology resources  
173 were well received by those who had used them, with all four resources being rated as useful and 93% of  
174 respondents agreeing that they were easy to understand (Figure 4). However, 86% of respondents still felt  
175 anxious about the academic content of vet school despite finding both sets of resources easy to understand  
176 and felt they complimented previous teaching.

177 Figure 3 approx here

178 Figure 4 approx here

179 *Free-Text Responses*

180 Although there was a small sample size, a number of students left comments in the free-text responses.  
181 Time pressures meant that some students didn't get around to using the resources, whereas others said  
182 that the academic content of the course:

183 *"Wasn't what I was worried about"*

184 For those who did utilise the pre-arrival content, they broadly characterised the resources as useful. Some  
185 students indicated they felt they had not received enough teaching of this sort prior to their programme:

186 *"Never been taught anything in these areas before. It made it a lot easier to access the course."*

187 *"I found it all very interesting, but found the ... A level has definitely left me with a massive gap in  
188 my knowledge."*

189 However, other students felt that the materials were more like review materials and helped them to 'get  
190 back into the swing' of learning after the long summer break.

191 *"Interesting to learn, helped consolidate old stuff and its nice to know what the lecturer is talking  
192 about, especially in the first few weeks"*

193 *"I don't think I realised how big a part of my course cell biology was (as there is tons of it), if I'd  
194 known I would have revised my cell biology from advanced higher a bit more beforehand, perhaps  
195 highlighting that would be of benefit"*

196 Some comments indicated that the students appreciated the introduction to the type of degree they were  
197 undertaking, referring to workload and helping them to form expectations of the veterinary degree before  
198 starting.

199 *"I found it a little bit too hard, and found I was having to do a fair bit of extra work. However, I think  
200 this prepared me for the nature of the degree."*

201 *"A glimpse of the academic contents of the vet programme"*

202 **Discussion**

203 It is striking that the majority of students who responded to the survey considered the Pre-Arrival  
204 resources to be easy to understand, beneficial to their learning, and yet 86% still considered themselves to  
205 be anxious about their upcoming programme. For veterinary students, common concerns in first year  
206 include: programme intensity; feeling unprepared for the academic load; a desire for more support from  
207 faculty; and frustration with a lack of clinical relevance in course material (19). Hafen and others (2008)  
208 employed a depression scale metric in first year students at Kansas State University and found that  
209 academic concerns and difficulty fitting in with peers was associated with more depressive states. Mental  
210 ill-health in veterinary students appears to be more prevalent than within the general population (21) and  
211 are often strongly associated with the students' concerns about their academic performance (22). One  
212 could argue that the students responding to the post-course survey may not have been a representative  
213 sample of the programme. Perhaps they may have been motivated to respond to the survey because they  
214 recalled their own feelings of anxiety. In addition, the low numbers of respondents necessitate caution in  
215 generalising these responses to the wider population, however it must be recognised that these feelings of  
216 anxiety are often seen in studies within the veterinary student body (23). Further, even as recently as 2011,  
217 veterinary students and practicing veterinarians underestimated the risk these mental health problems  
218 posed to the profession (24). While these results characterise a small population, there is little to suggest  
219 that these students are particularly unusual among the veterinary community. Although we considered this  
220 sample representative, and so provided descriptive information about it, we elected not to perform  
221 inferential statistical comparisons, e.g. to explore differences in reported anxiety between students who  
222 had and had not made use of the resources. Despite this, we would consider that the extent of the anxiety  
223 felt by these students, even in spite of the pre-arrival course intended to ease transition, is an important  
224 finding to report.

225 There were two broad aspects of this study: how did students utilise a pre-arrival course, and how did it  
226 affect their attitudes to the veterinary curriculum? A post-course survey was deemed the most appropriate

227 method of exploring this second question, given the difficulty in accessing students prior to arrival. The  
228 exploration of learner analytics allowed for a much more detailed investigation of the first question. In  
229 both the longitudinal and resource-specific tracking, we found that students were most likely to undertake  
230 this study in what could be termed their 'spare time', at weekends and in evenings. The use of learner  
231 analytics to explore student behaviour has been a hot topic within education research in recent years, with  
232 hopes that it will allow faculty to identify what students are at risk (25) and enable early interventions.  
233 There has been limited investigation of learner analytics in the veterinary curriculum, and the result from  
234 this study suggest that first year students are accessing learning materials outside of normal working hours.  
235 There may be many reasons for this, such as having a part time job. However, future studies utilising  
236 learner analytics may wish to consider a temporal approach to investigating when students make use of  
237 resources. Dissatisfaction with veterinary work, including workload and associated stresses, is the most  
238 common reason vets give for leaving the profession (26). One might easily imagine how this could feel if  
239 the vet in question had been putting in the overtime even before they reached vet school. It is also  
240 worthwhile considering whether the provision of pre-arrival materials may have in fact increased students'  
241 anxiety. Some students commented that the material made them more aware of gaps in their knowledge.  
242 While the course was highlighted as an optional extra, and perhaps focussed less on academic material, but  
243 instead of building more resilience skills. One result of note was the substantial decrease in student  
244 numbers in the second year, which may have been due to the peers responsible for student retention  
245 moving on through the programme. Without sustained encouragement from peers, incoming students may  
246 have been less likely to explore these resources, suggesting that resources like this should be heavily  
247 promoted year on year. This small study suggests that further exploration of learner analytics at a wider  
248 scale in the veterinary curriculum may help us better understand the actual behaviours of veterinary  
249 students, and the pressures they are under.

250 Finally, it is worthwhile asking whether peer-developed resources were the best choice for such an  
251 intervention. Peer-to-peer learning is prevalent within medical education (27) and yet is a skill that faculty

252 must develop within their students (28). There are many assumptions regarding the benefits of peer-to-  
253 peer learning, and within this school, peer-assisted-learning has proven very successful (16), however some  
254 research has found that the peers themselves receive no deeper understanding of learning after teaching  
255 (29). Although the peers' learning was not evaluated in this study, they were fully involved in the  
256 evaluation of the exercise, designing surveys and analysing data, enabling them to practice a variety of  
257 skills. On the other hand, it can be argued that peers are best placed to create such resources for other  
258 learners, regardless of the peer's experience. Peers are able to bring insight from their own experiences,  
259 creating learner-centred teaching opportunities(30). In a similar study, where peers created e-learning  
260 materials, the students found the peer-created materials useful and 'highly appreciated' their inclusion(31).  
261 The inclusion of peer-created materials could help to foster a sense of community and ownership over a  
262 programme. Within this school, we also utilise peer-generated multiple choice questions in an assessment  
263 bank, and students report enjoyment and collegiate learning through the use of such peer-created systems  
264 (32). In this study, the pre-arrival students felt the materials were at the right level and useful, even when it  
265 may not have recapped material from their secondary education. From a practical standpoint, peer assisted  
266 learning is often thought to alleviate faculty workload. Although this was not formally assessed here,  
267 faculty were involved throughout, evaluating resources and assisting with development In hindsight, take  
268 up may have been greater if this has been communicated to the pre-arrival students as this may have given  
269 a higher level of authenticity and creditability to the peer-created resources.

270 The provision of peer-provided learning resources for pre-arrival students was taken up by 39% of  
271 students, and was considered beneficial by the majority of those students. While students still felt anxious  
272 about the transition into veterinary school, the peer-provided resources were a useful addition. Peer-  
273 provided resources can assist with transitional points, but cannot be considered a silver bullet with which  
274 the challenges facing the veterinary profession can be 'fixed'..

275

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359 **Table 1:** Resources produced for the Pre-Arrival courses

<b>Resource</b>	<b>Title</b>	<b>Contents</b>	<b>Description</b>
<b>Anatomy and Histology</b>	An Introduction to Anatomy	Introducing some of the terminology used in the BVM&S programme	Articulate Storyline Package
	Tissues of the Body	Introduction to four tissues (connective, epithelial, muscle, and nervous)	Articulate Storyline Package
	The Body Systems	Introduction to six of the systems (skeletal, cardiovascular, respiratory, digestive, renal, and reproductive)	Articulate Storyline Package
	General Anatomy of the Dog	The above topics were brought together to provide these in context	Articulate Storyline Package
<b>Cell Biology</b>	Cell Anatomy	Introducing the topics of the cells and cell compartments, plasma membrane, extracellular matrix, cytoskeleton and cell adhesion	Articulate Storyline Package 3D Model of Eukaryote Cell
	DNA and Genetics	Introducing DNA structure, DNA replication, transcription, gene expression, translation, and DNA damage	Articulate Storyline Package Video from Khan Academyx4
	Enzymes	Including structure, function and kinetics	Khan Academy Playlist
	Early Embryogenesis		Video from Khan Academy
	Germ Layer Derivatives		Video from Khan Academy
<b>Useful Information</b>	Starting As a New Vet Student at Edinburgh		Articulate Storyline Package

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362 **Table 2:** Demographics of pre-arrival survey

	<b>% Of Participants (N)</b>
<b>Age</b>	91.7% (22)
<b>17-20</b>	4.2% (1)
<b>21-24</b>	4.2% (1)
<b>25+</b>	
<b>Student Status</b>	
<b>International</b>	25.0% (6)
<b>European</b>	8.3% (2)
<b>Domestic</b>	66.7% (16)
<b>Had Completed Prior Degree</b>	4.2% (1)
<b>School Leavers</b>	95.8% (23)
<b>Had Accessed Pre-Arrival Course Prior to Study</b>	79.2% (19)
<b>Had Not Accessed Pre-Arrival Course Prior to Study</b>	20.8% (5)