

## Faculty Perception of an Embedded Research Project in the Undergraduate Veterinary Curriculum

### List of Authors:

Emily Cehrs

Accelerated Bachelor of Veterinary Medicine Student, Royal Veterinary College  
The Royal Veterinary College, Hawkshead Lane, North Mymms, Hatfield, Hertfordshire,  
AL9 7TA, UK

BVetMed, MRCVS

[ecehrs4@rvc.ac.uk](mailto:ecehrs4@rvc.ac.uk)

Ludovic Pelligand

Department of Veterinary Clinical Sciences, The Royal Veterinary College, Hawkshead  
Lane, North Mymms, Hatfield, Hertfordshire, AL9 7TA, UK

Dr Med.Vet, PhD, MRCVS, FHEA

Associate Professor in Veterinary Anaesthesia and Clinical Pharmacology

[lpelligand@rvc.ac.uk](mailto:lpelligand@rvc.ac.uk)

Renate Weller

Department of Veterinary Clinical Sciences, The Royal Veterinary College, Hawkshead  
Lane, North Mymms, Hatfield, Hertfordshire, AL9 7TA, UK

Dr Med.Vet, PhD, MRCVS, FHEA

Professor in Comparative Imaging and Biomechanics

[rweller@rvc.ac.uk](mailto:rweller@rvc.ac.uk)

## **ABSTRACT**

In this article, we describe faculty perception of a research project (RP) embedded in the final year of the undergraduate veterinary curriculum and look at factors associated with overall perception of the project. It was hypothesized that faculty have a dichotomous attitude toward the research project with faculty either viewing it positively or negatively, and this opinion of the project would be largely influenced by the background of the faculty member, in particular, their role at the RVC. This hypothesis was explored via a questionnaire consisting of 26 questions in categorical format, Likert-scale format, and multiple ranking questions that discussed faculty demographics, faculty perception of the embedded project, and generic skills. Faculty had an overall positive view of the project and found it to be a useful part of the undergraduate curriculum (83.3% of faculty found it to be useful or very useful). Faculty's perception of the project was influenced by their role at the college ( $p = 0.017$ ), the species they primarily work with ( $p = 0.05$ ), and their opinion on time spent supervising the final year project ( $p = 0.003$ ). This report concludes that faculty view research to be an important and useful part of the undergraduate veterinary curriculum.

## **KEY WORDS**

Faculty perception, undergraduate education, research project, veterinary

## **INTRODUCTION**

Veterinary research serves as the interface between science (including basic science, biomedical science, and social science) and animal and human health and is essential for improving and facilitating advances in One health medicine[1]. In today's society, the public has high expectations for protecting human and animal health and finding treatments for emerging and ongoing diseases. Due to these high expectations, there is urgent need to provide adequate resources and training programs at veterinary institutions in order to facilitate veterinary research [1, 2]. This need for implementing research in training programs is critical as the number of veterinary scientists and researchers has slowly been declining and now there is a current shortage of veterinary researchers. This shortage has been found to be due to several reasons, including a declining interest in research among veterinary students, challenges recruiting scientists into research and teaching posts at universities, as well as retention issues due to faculty leaving academic positions to enter private practice [2-5].

Veterinary students have a wide array of career options post-graduation, however the majority of students are primarily interested in clinical practice, and a career in research is not widely considered [1]. In order to obtain more veterinary researchers from the graduate pool, the veterinary curriculum should contain direct research experiences in order to encourage consideration of a research career. Involvement in research experiences does not necessarily correlate with increased likelihood of a later research career [6], however it can lead to positive experiences for students that may spark interest in the profession. In medical students, it was found that a positive research experience and a supportive mentor lead to a consideration of a future research career [7]. Thus, if compulsory research experiences are included in the veterinary curriculum, good supervision and mentoring is needed in order to sway students to a research career [8].

In this study, we will look at faculty's perception of a compulsory research project embedded in the final year curriculum of the Bachelors of Veterinary Medicine (BVetMed) course at the Royal Veterinary College (RVC) and compare these perceptions to student perceptions of the research project, found in a published earlier study [9]. The earlier published study found that the majority of students had a positive attitude toward the research project after

completion and this attitude was correlated with perceived difficulty of the research project, perceived quality of supervision, as well as perceived supervisor enthusiasm. In addition, this study found that even though students had an overall positive view of the project, the majority of students thought that the time spent on the project would be better spent on something else. Finally, although students would prefer to spend their time on something other than the research project, the majority of students would do the project if they were theoretically given the option to obtain a Master's Degree upon extension of the project by a month (in the United Kingdom a Master's Degree can be obtained during or after a five year veterinary degree. A Master's degree involves a research project relative to the size of this research project and thus a proposal was made that a Master's degree could be obtained from the project, if students had slightly more time to complete, finalize, and publish their research).

Eight weeks of the final year BVetMed Course at the RVC are allocated for student research. During this time, students must undertake a research project of their choice in which they design the experiment, collect and analyse data, and write a report detailing their project and results. The aim of this project is for students to gain experience in reading, understanding, and using research data allowing them to gain skills in evidence based veterinary medicine (EBVM). A few essential EBVM skills students gain from this include forming a clinical question, critical thinking, and analytical ability. During their project, students identify a faculty supervisor for their project who is either a full-time researcher, a full-time clinician in the on-campus referral hospital, or is both a clinician and researcher. The supervisor assists and advises their students on all aspects of the project including study design, data collection, data analysis, and editing of the final report. The supervisor is expected to remain in contact with their student throughout the duration of the project. The rest of the final year of the BVetMed course at the RVC consists of 28 weeks of Intra-Mural Rotations (IMR) conducted in the university teaching hospitals or associated clinics and 16 weeks of Extra-Mural Studies (EMS) where students organize to see veterinary practice at practices of their choice.

This study aims to determine faculty's overall attitude as well as perceived importance and usefulness of the embedded research project in the undergraduate curriculum. In addition, in the discussion this study will compare faculty's perception to student's views of the research project.

It was hypothesized that faculty have a dichotomous attitude toward the research project with faculty either viewing it positively or negatively, and this opinion of the project would be largely influenced by the background of the faculty member, in particular, their role at the RVC.

## **MATERIALS AND METHODS**

### ***Study Overview***

This study surveyed academic faculty at the Royal Veterinary College, London, United Kingdom in 2013. Academic faculty actively involved in teaching veterinary students at the RVC were emailed and requested to complete an online questionnaire via SurveyGizmo. Participation in the study was voluntary and all responses were collected anonymously. Ethical approval was given by the RVC Ethics and Welfare Committee.

1

### ***Questionnaire Design***

2 The survey consisted of 26 questions, 18 of which discussed faculty perceptions of the  
3 embedded research project, two discussed generic skills, and six were demographic  
4

5 questions. Of the questions asked 11 were categorical questions, seven were in Likert-scale  
6 format, two were ranking questions, and six were open format questions. The questionnaire  
7 was developed on the basis of interviews conducted with 8 faculty members and edited after  
8 testing the original draft on 12 members of faculty, taking their feedback into account.

#### 9 10 Demographics

11 Demographics of faculty were explored via six questions. Faculty were asked to note down  
12 their gender, age, nationality, and role at the RVC (clinician, researcher, or combination of  
13 both). Faculty ages were split into three groups (30 and below, 31 – 44, and 45 and above)  
14 for categorization before statistical analysis. Faculty were asked to relate their research  
15 background and what species they primarily work with.

#### 16 17 Faculty Involvement in the Final Year Research Project

18 Faculty were asked if and how long they have been involved with supervision of the final  
19 year research project (this was split into three categories for data analysis; 0-5 years, 6-10  
20 years, and more than 10 years of involvement), what other categories of students they have  
21 supervised for research projects, and how many publications have arisen from final year  
22 student projects they have supervised.

#### 23 24 Faculty Perception of the Research Project

25 The attitudes of faculty toward the final year research project were assessed by asking them  
26 about the general usefulness of the research project in the BVetMed curriculum, their opinion  
27 on the time allocated to the final year RP, if they thought the time spent doing the research  
28 project would be better spent on something else, and an alternative option if they thought the  
29 research project should be spent doing something else. Faculty opinions about supervising the  
30 final year research project and how it contributed to their workload was assessed and their  
31 contact time and email response time to their research students were assessed by categorical  
32 questions.

#### 33 34 Faculty Perception of Student Attitude Toward Research

35 Faculty were also asked about what they thought students' opinions of the research project  
36 were. This was assessed by asking faculty how they thought the majority of students felt  
37 about their final year research project, how difficult they thought students found the project,  
38 and asking how much effort they thought students put into their research project in  
39 comparison to other components of final year.

#### 40 41 Faculty Perception of Generic Skills

42 Faculty's perception of importance of generic skills for veterinary graduates were assessed via a  
43 four-point Likert scale. Faculty's perception of contribution of final year components to  
44 generic skills were assessed by asking faculty to rank on a scale of 1- 4 (one being  
45 detrimental, and four has contributed in a major way) how much EMS, IMR, the Research  
46 Project, and free-study contributed to the development of generic skills in students.

#### 47 48 **Data Analysis**

49 Data distribution was assessed using histograms and Kolmogorov-Smirnov tests. Cronbach's  
50 alpha coefficient was used to test the reliability of the survey. Kruskal-Wallis tests were used  
51 to determine differences in overall opinion of the project and the usefulness of the different  
52 components, contact time with students, and email response times in relation to job role of  
53 the faculty. Kruskal Wallis tests were also used to compare faculty's opinion of the project  
54 with the species they primarily work with as well to compare faculty's overall opinion of the

55 project with faculty's opinion on the time spent supervising the final year research project.  
56 Spearman's Rho was used to determine correlations between number of students supervised  
57 and number of publications. Correlations between faculty contact time with students and  
58 their overall opinion of the project were calculated using Spearman's rho. The  $p$  value was set  
59 as  $< 0.05$  for all tests. Data was entered into a Microsoft Excel spreadsheet and data analysis  
60 was performed in SPSS.

61

## 62 **RESULTS**

### 63 ***Faculty Demographics***

64 Out of 144 respondents 66 faculty members fully completed the questionnaire. Of the  
65 complete respondents, 35 (53.0%) were female and 31 (46.9%) were male. The respondents'  
66 ages ranged from 25 to 61 with a mean age and standard deviation of  $40 \pm 8.5$  years. Of the  
67 respondents, 42 (63.6%) were British, and the rest identified themselves as international  
68 faculty. Of the respondents, seven (10.6%) identified themselves as full time clinicians, 13  
69 (19.6%) were full time researchers, 21 (31.8%) worked as both researchers and clinicians,  
70 and 24 (36.3%) identified themselves as 'other' (namely as PhD students and interns). Forty-  
71 one percent of the respondents primarily worked with small animals, 21% worked with farm  
72 animals, 18% with equine, 5 % with exotics, and 15% specified other, in which the responses  
73 included pathogens, mixed species, humans, and wildlife.

74

### 75 ***Faculty Research Background and Final Year Research Project Involvement***

76 Forty-five of the 66 faculty members (68.1%) indicated they had a PhD and 20 (30.3%) had a  
77 Master's degree. Of the 66, 40 (60.6%) had experience in research, having five or more  
78 papers in peer reviewed journals, 15 (22.7%) had limited experience in research having four  
79 or less papers in peer reviewed journals, and two (3.0%) had no research experience having  
80 no papers in peer reviewed journals.

81

82 Involvement in final year research projects as supervisors ranged from zero to 24 years, with  
83 five respondents having never supervised to one respondent having supervised for 24 years.  
84 The average time spent supervising research projects was  $5.8 \pm 5.5$  years (Median = 4.00 with  
85 interquartile ranges of 2.00, 4.00, and 7.25). The majority of respondents (56%) had  
86 supervised student research projects for two to six years. Faculty involved with supervising  
87 student research projects had supervised between 1-80 projects with the majority of faculty  
88 (54.2%) supervising between one to ten projects. Thirty-four-point eight percent of  
89 respondents had supervised between 13 - 80 projects and 10.6% of respondents had not  
90 supervised any projects. The faculty involved with supervising the research project had an  
91 average of 2.36 research students per year. A positive correlation was found between how  
92 many final year projects faculty had supervised and the number of publications arising from  
93 final year projects ( $p < 0.001$ ) ( $\rho = 0.567$ ).

94

95 The majority of respondents (51.5%) felt that the time they put towards supervising final year  
96 project was just right, whereas 33.3% of respondents would like to have more time  
97 supervising if their other commitments would allow it, and 15.1% indicated that they would  
98 like to spend less time supervising final year projects.

99

100 Fifty-four percent of faculty had an average response time of 24 hours to student emails about  
101 their final year research project, whereas 39.4% took one to three days to respond to student  
102 emails and 4.5% of faculty took four to seven days to respond. No significant difference was  
103 found between faculty email response time and faculty role at the RVC ( $p = 0.077$ ,  $H =$   
104  $6.837$ ) or overall opinion of the research project ( $p = 0.523$ ,  $H = 1.296$ ).

105  
106 Thirty-nine percent of faculty had on average less than 1 hour a week of contact time with  
107 their research student during their final year research project. A proportion of 42.4% had one  
108 to three hours a week of contact time, 12.1% had four to six hours a week of contact time, 3%  
109 spent seven to eight hours a week in contact with their student, and the last 3% spent more  
110 than eight hours a week in contact with their research students. No significant difference was  
111 found between faculty contact time with students and faculty role at the RVC ( $p = 0.858$ ,  $H =$   
112  $.766$ ) or overall opinion of the research project ( $p = 0.433$ ,  $H = 2.745$ ).

113

#### 114 ***Faculty Attitudes Toward Research in the Undergraduate Curriculum***

115 Table 1 shows the distribution of responses for the usefulness of the project overall as well as  
116 the project's individual components. Overall, 50% of respondents felt that the research  
117 project as part of the undergraduate curriculum was useful, whereas 33.3% of respondents  
118 thought it was very useful, 4.5% were indifferent, and 12.1% thought it was useless.  
119 Respondents felt that the write-up portion of the research project was the most beneficial part  
120 of the project followed by data analysis and literature reviews. Respondents felt that the  
121 study design and data collection portions of the project were the least beneficial. No  
122 difference in scores was found between faculty age, gender or length of involvement with the  
123 research project, or previous research experience with their overall opinion of the research  
124 project, however a difference was found between faculty role at the RVC and overall opinion  
125 of the project ( $p = 0.017$ ,  $H = 8.203$ ). Full time researchers (mean perception score =  $4.46 \pm$   
126  $0.52$ ) or researchers/clinicians (mean score =  $3.57 \pm 1.08$ ) found the project to be more useful  
127 than those who worked just as clinicians (mean score =  $3.42 \pm 0.98$ ). In addition, a significant  
128 difference between overall attitude of the usefulness of the project and the species faculty  
129 primarily work with was found ( $p = 0.05$ ,  $H = 9.494$ ). The faculty who primarily worked  
130 with farm animals, found the project to be most useful (mean =  $4.42 \pm 0.51$ ), those that  
131 worked with small animals found it to be slightly less useful (mean =  $3.78 \pm 1.05$ ), and  
132 faculty that worked with equids, found the project to be the least useful (mean =  $3.75 \pm 1.14$ ).  
133 Faculty's overall opinion of the usefulness of the project was also found to be significantly  
134 different ( $p=0.003$ ,  $H = 11.677$ ) with faculty's opinion of their time spent supervising the  
135 final year project. Faculty who thought the time they spent supervising the research project  
136 was either just right (mean =  $4.35 \pm 0.64$ ) or they wanted to spend more time supervising if  
137 the time allowed it (mean =  $4.04 \pm 0.90$ ), felt the project was more useful. Faculty who  
138 wanted to spend less time supervising the final year project, found the project to be less  
139 useful (mean =  $2.89 \pm 1.17$ ). (Place Table 1 here).

140

#### 141 ***Faculty Opinion on Time Allocation***

142 The majority of respondents (71.2%) felt that the time allocated to the final year research  
143 project was adequate, whereas 19.7% felt it was too short, 4.5% felt it was much too short,  
144 and 4.5% felt that the time allocated was too long. When asked if the time allocated to the  
145 final year research project would be better spent on something else, 75.8% responded no,  
146 21.2% felt that it should be spent on something, and 3% did not know. The 21.2% of  
147 respondents that felt that the time would be better spent on something else, thought the time  
148 should be used for extra-mural studies, intramural rotations, or more classroom teaching.  
149 When asked if extending the final year RP for another month if students would gain a  
150 Masters in Veterinary Science was a good idea, respondents had mixed opinions. Forty-five  
151 and a half percent felt that it would be a good idea but conversely, 54.5% thought it was a bad  
152 idea. When asked where the extra time would come from if the research project was  
153 extended by a month, ten respondents thought the project should be completed during the

154 time between finals and graduation or the final year should be extended. Five individuals  
155 thought IMR time should be shortened, four preferred EMS time to be shortened, and nine  
156 thought the classroom component of the course should be shortened.

157

### 158 ***Faculty Perception of Student Attitude Toward Research***

159 Table 2 shows faculty perception of students' opinion of the research project. The majority  
160 (42.4%) of respondents felt that most students thought their final year research project was  
161 'okay' whereas 31.8% felt that students did not like the project, 15.2% thought students really  
162 enjoyed the project, and 10.6% thought students were indifferent. Most faculty thought that  
163 students liked the data collection portion of their project the most and least enjoyed the data  
164 analysis and write-up parts of their project. Most faculty were in agreement that they think  
165 students either do not like the project (31.8%) and its different components or they think it is  
166 'okay' (42.4%). Not many faculty felt that students hated the project, really enjoyed it, or  
167 were indifferent about it.

168

169 Table 3 shows the distribution of faculty perception of student's perceived difficulty of the  
170 final year research project. Most faculty (60.6%) believed that students found their project  
171 difficult and 34.8% thought that students found the project neither difficult nor easy. Faculty  
172 thought that students found the data analysis portion of their project most difficult followed  
173 by study design and write-up. Faculty thought that students found the data collection and  
174 literature review portions of their project to be easier.

175

176 When faculty were asked if they thought students would extend their research project for  
177 another month if they were to gain a Masters in Vet science from it, 60.6% of faculty  
178 responded 'no', and 39.4% responded 'yes'. Those that responded 'yes' were then asked  
179 where student would suggest the extra time for the research project would come from.  
180 Eleven individuals thought students would suggest the classroom component of the course be  
181 shortened, eight thought students would want the final year to be extended, seven believed  
182 students would want EMS time to be shortened, six responded students would want to use the  
183 time between finals and graduation, and two thought students would want time on intra-mural  
184 studies to be shortened. (Place Table 2 and 3 here).

185

### 186 ***Faculty Perception of the Importance of Generic Skills and the Contribution of 187 Components of the Final Year Course to the Development of Generic Skills***

188 (Place Table 4 here) Faculty judged oral communication skills to be the most important  
189 generic skill for a veterinary graduate to possess. Oral communication skills was given a  
190 mean score of  $3.95 \pm 0.37$  (1 being completely unimportant and 4 being very important). This  
191 was followed by problem solving ( $3.83 \pm 0.51$ ) and teamwork ( $3.79 \pm 0.51$ ). The skills  
192 designing experiments ( $2.23 \pm 0.70$ ) and statistics ( $2.45 \pm 0.73$ ) were deemed the least  
193 important for veterinary graduates. Researchers found the skills 'information gathering' ( $p =$   
194  $0.049$ ,  $H = 7.871$ ), 'information evaluation' ( $p = 0.014$ ,  $H = 10.669$ ), 'critical thinking' ( $p =$   
195  $0.03$ ,  $H = 8.718$ ), and 'designing experiments' ( $p = 0.003$ ,  $H = 14.298$ ) to be more important  
196 than clinicians or clinician/researchers. (Place Table 5 here).

197

198 Compared to other components of the final year course, faculty felt the research project  
199 contributed most to written communication skills, information gathering, evaluating  
200 information, statistics, ability to work independently, management skills, time management  
201 skills, problem solving, and critical thinking. The research component of the course  
202 contributed the least to oral communication skills and teamwork. When determining if there  
203 were any significant differences in the data, it was found that researchers and

204 researcher/clinicians felt the research project contributed more to written communication  
205 skills than full-time clinicians ( $p = 0.043$ ,  $H = 8.171$ ).

206

## 207 **DISCUSSION**

208 In this study, we assessed faculty perception of an embedded research project in the  
209 undergraduate curriculum and compare these perceptions to student views of the project  
210 found in an earlier study. Overall, most faculty felt that the research project as part of the  
211 final year course at the RVC was useful and should remain part of the curriculum.

212

### 213 ***Comparison of Faculty and Student Perception of the Research Project***

214 Faculty's perceptions of the embedded research project were compared to student perceptions  
215 of the project found in a previously published study[10]. Overall, faculty and students were in  
216 agreement regarding most opinions of the research project. The following agreements were  
217 found: the time allocated to the project was adequate, faculty overall opinion of the project  
218 and student opinion after completion of the project, faculty's view of student opinion of the  
219 project and student's actual opinion, and the difficulty of the project overall as well as its  
220 components. These corresponding views are a positive finding, as it reveals that faculty are  
221 aware of student opinion as well as the difficulty of the project, and thus will be better able to  
222 provide correct mentoring and support to their research students.

223

224 Besides the overall corresponding views of the project, a few differences were found between  
225 faculty and student perceptions of the project. When asked if the time spent on the research  
226 project would be better spent on somethings else, faculty and students disagreed. Students felt  
227 the time would be better spent on something else, whereas faculty felt the opposite. Another  
228 difference between faculty and student opinions was in their view of extending the research  
229 project if a Masters in Vet Science would be obtained from it. An overwhelming majority of  
230 students would be willing to extend their project if they were to gain a Masters in it, whereas  
231 the majority of faculty thought the project should not be extended in order for student to  
232 obtain an extra degree [10]. An additional area in which faculty and student opinions  
233 differed, was their perception of the contribution of the different final-year components to the  
234 development of generic skills.. It is concerning that there are some differences in opinion  
235 between faculty and students as these differences might show a disconnect between faculty  
236 and students and show that faculty are no longer in-tune with student mind-sets, however  
237 these are direct comparisons and thus conclusions should not be drawn directly from these  
238 differences. More research is needed in order to determine the underlying reason for these  
239 differences in staff and student opinions.

240

### 241 ***Faculty Perception of Time Allocation***

242 One of the important findings from this study was faculty's perception of the time they spend  
243 supervising final year projects. The majority of respondents felt that the time they put into  
244 supervising final year research projects was just right or they would like to spend more time  
245 supervising. Some faculty however, would have liked to spend less time supervising. It is  
246 encouraging that most faculty are happy with the amount of time spent supervising as it  
247 shows they are able to cope with their regular workload as well as supervise their research  
248 students, however, with the increasing size of the veterinary classes at the RVC [11], some of  
249 these factors are slightly concerning. At the time of this study, the veterinary class size was  
250 under two-hundred students, however in two years' time, the final year class size will be over  
251 300 students. At the time of this study, faculty members were primarily happy with the  
252 amount of time they spent supervising projects, in light of the rest of their workload.

253 However with increasing class sizes, each faculty member may now have to take on more



254 students, and consequences may arise. With their normal workload plus additional research  
255 students each year, faculty may not have as much time to spend advising and mentoring each  
256 student and email response times may increase and contact time with students may decrease.  
257 It has been seen that a supportive mentor has a strong influence on students and their research  
258 productivity, and thus if students are to be swayed toward a research career, faculty  
259 supervisors need to be present and supportive [12-14]. In 2013 when the student study was  
260 conducted, the majority of students rated the quality of supervision for their project as either  
261 good or excellent, however, a small percentage thought the supervision was terrible or non-  
262 existent [10]. The majority of these ratings are excellent, however if class size increases and  
263 the quality of supervision decreases, student opinion of the project may fall and student  
264 achievement and productivity may decrease as well. These concerns over the quality of  
265 education with increasing class size are echoed by many, including members of the British  
266 Veterinary Association [15]. As demonstrated by others [16, 17] students who felt supported  
267 by teaching faculty and who found them helpful, sympathetic, and available were more  
268 engaged with their higher education studies. In addition, students who had more frequent  
269 interactions with faculty had higher levels of engagement and satisfaction. Furthermore, it  
270 has been found that teaching faculty who have regular contact with students are more attuned  
271 to students and are better able to understand student perspectives and are better able to meet  
272 student learning needs[16, 17]. In order to maintain student enthusiasm and interest in  
273 research at its current level, quality of supervision of the research project must not  
274 decrease[14]. Thus, if veterinary education class sizes keep increasing, the feasibility and  
275 administration of the research project must be reviewed.

276

### 277 ***Review of the Research Project***

278 Besides looking at the feasibility of this project, the overall future of this project should be  
279 reviewed. With not all students having a positive view of the project and the possibility of  
280 faculty struggling to maintain high quality of supervision, it may not be beneficial for the  
281 research project to remain in the undergraduate curriculum. Universities in the United  
282 Kingdom have the challenge of maintaining a high quality of education to their students as  
283 well as providing students with the experience and education that they desire, in order to  
284 score well on the National Student Survey (a survey completed by final year students which  
285 allows them to give feedback of their completed course which, in turn, helps the universities  
286 to shape the future of the course) [18]. If RVC students would prefer to spend their time on  
287 something other than the research project, the curriculum and this project may need to be  
288 reviewed in order to meet student expectations. In addition, the argument can be made that  
289 an embedded research project is a waste of valuable resources that could instead be invested  
290 into furthering student's clinical skills. However, these opinions and student expectations  
291 need to be balanced with the importance of the generic skills gained during research  
292 experience that are essential for practicing evidence-based veterinary medicine as well as  
293 fostering skills that will help graduates succeed not only in veterinary medicine but also in  
294 other professions.

295

296 In conclusion faculty perception of an embedded research project was influenced by several  
297 factors – faculty's role at the university, species they primarily work with, and their opinion  
298 on the amount of time spent supervising projects. In order for an embedded research project  
299 to remain successful at helping recruit students into research, faculty need to have a positive  
300 opinion of the project and need to be supportive mentors who have regular contact with their  
301 research students.

302

303

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